VIRGINIA PAMPHLETS

Vol. 6

Agriculture

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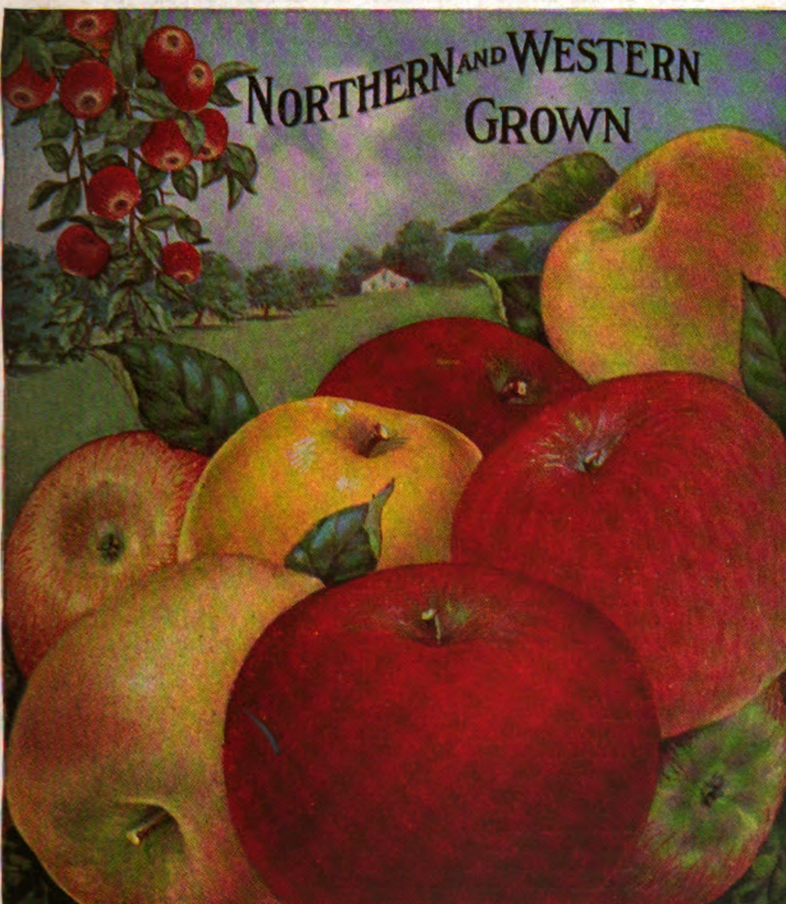
APPLES



Published by

VIRGINIA-CAROLINA CHEMICAL CORP.

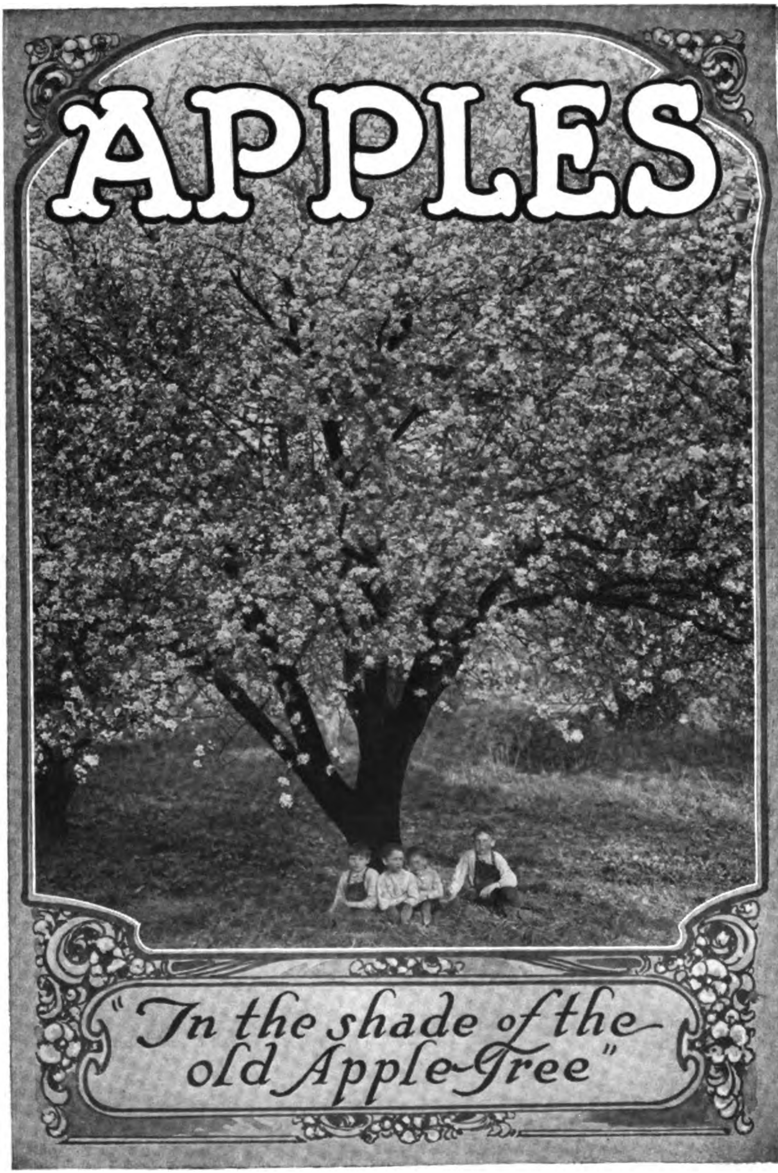
RICHMOND, VIRGINIA

High Grades of Fertilizers

Recommended by

The Soil Improvement Committee of the National Fertilizer Association.

Crop	Sandy Soil APA-A-P	Loam Soil APA-A-P	Clay Soil APA-A-P
Alfalfa, seeded down	10-2-4	12-2-2	12-2-0
Alfalfa, top dressing	12-0-4	12-0-2	16-0-0
Asparagus	7-5-2	7-5-2	7-5-2
Apples, sod orchard	7-5-2	8-6-0	8-6-0
Apples, tilled orchard	10-3-4	10-3-2	12-3-0
Barley	10-2-4	12-2-2	12-2-0
Buckwheat	10-2-4	12-2-2	12-2-0
Brussels Sprouts	10-3-4	10-3-2	12-3-0
Beets	10-3-4	10-3-2	12-3-0
Beans, garden	10-3-4	10-2-4	10-2-4
Beans, field	10-2-4	12-2-2	12-2-0
Blackberries	12-2-2	12-2-2	12-2-2
Corn, for grain	10-2-4	12-2-2	12-2-0
Corn, for silage	10-2-4	12-2-2	12-2-0
Clover, seeding	10-2-4	12-2-2	12-2-0
Clover, top dressing	12-0-4	12-0-2	16-0-0
Cabbage	10-3-4	10-3-2	12-3-0
Cauliflower	10-3-4	10-3-2	12-3-0
Carrots	10-3-4	10-3-2	12-3-0
Cucumbers	10-3-4	10-3-2	12-3-0
Celery	10-3-4	10-3-2	12-3-0
Grass, seeding	10-2-4	12-2-2	12-2-0
Lettuce	10-3-4	10-3-2	12-3-0
Millet	10-2-4	12-2-2	12-2-0
Meadow, top dressing	7-5-2	8-6-0	8-6-0
Mangels	10-3-4	10-3-2	12-3-0
Melons	10-3-4	10-3-2	12-3-0
Oats	10-2-4	12-2-2	12-2-0
Onions	8-2-8	8-2-8	8-2-8
Permanent Pastures, top dressing	12-0-4	12-0-2	16-0-0
Parsnips	10-3-4	10-3-2	12-3-0
Potatoes, late	10-3-4	10-3-2	12-3-0
Peas, field	10-2-4	12-2-2	12-2-0
Peas, garden	10-3-4	10-2-4	10-2-4
Peaches	7-5-2	8-6-0	8-6-0
Rye, fall seeding	10-2-4	12-2-2	12-2-0
Rye, spring top dressing	7-5-2	8-6-0	8-6-0
Rutabagas	10-3-4	10-3-2	12-3-0
Raspberries	12-2-2	12-2-2	12-2-2
Sweet Corn	10-3-4	10-3-2	12-3-0
Sugar Beets	10-3-4	10-3-2	12-3-0
Spinach	7-5-2	7-5-2	7-5-2
Strawberries, spring setting	10-3-4	10-3-2	12-3-0
Strawberries, top dressing	7-5-2	8-6-0	8-6-0
Squash	10-3-4	10-3-2	12-3-0
Timothy, top dressing	7-5-2	8-6-0	8-6-0
Turnips	10-3-4	10-3-2	12-3-0
Tomatoes, cannery	10-2-4	10-2-4	10-2-4
Wheat, fall seeding	10-2-4	12-2-2	12-2-0
Wheat, spring top dressing	7-5-2	8-6-0	8-6-0


APPLES
"In the shade of the old Apple Tree"

APPLES

NORTHERN AND WESTERN GROWN

Published by

CROP BOOK DEPARTMENT

VIRGINIA CAROLINA V-C Fertilizers CHEMICAL CORP.

Incorporated

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V-C AGRICULTURAL BUREAU.

For the benefit of our customers and friends we have recently established at our Home office at Richmond, Va., an **Agricultural Service Bureau.** As Director of the Bureau, we have secured Prof. A. E. GRANTHAM, a practical and scientific agronomist who was formerly in charge of the Agronomy Department at the Delaware Agricultural Experiment Station.

This Bureau is maintained to aid farmers in getting better returns from the soil.

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This service is free.

Address: **AGRICULTURAL SERVICE BUREAU,**
Virginia-Carolina Chemical Co.
Richmond, Va.

APPLES

NORTHERN AND WESTERN GROWN

THE STORY OF APPLE growing in this country is rich in romance and success. It is true that there have been many unsuccessful adventures in this industry but most of them have been due to mistakes, economic and technical, or from misrepresentation. This booklet gives the methods and results of America's practical growers with the hope that more orchardists may enjoy the success that fruit growing offers.

The apple is one of the most popular and important of the tree fruits. It is grown extensively in Northern Europe, Southeastern Canada and the northern half of the United States and promises to occupy a more important place in the future. In sections south of these boundaries where the mean summer temperature is more than 79 and 80 degrees, this fruit is rarely found except in an occasional home orchard.

History tells us that the cultivated apple was brought over to this country by the early settlers of the Plymouth colony. Some trees that are more than a century old are still standing and until recently there stood an apple tree in New York state which was planted about 200 years ago. The pioneers of the early days carried young apple trees and seed with them and orchards were set out as they took up new land. It would almost be possible to mark the advance of civilization from the Atlantic to the Pacific by the steady march of the apple. The Indians were quick to appreciate this fruit and planted it in their lands, especially along the borders of rivers and lakes.

Interest in the crop has continued to increase until the present day. In 1910 it was estimated that there were about 4,500,000 acres planted to apple trees in the United States which constitutes about 56% of the total acreage planted to fruits and nuts, as reported by the United States Department of Agriculture. At that time the value of the crop was $90,000,000, or about 4 per cent of the value of all crops. It is known that many states have increased their apple acreage 10 to 15 per cent since that time.

The Development of the Apple Industry

From the foregoing it is evident that the apple thrives well in this country and is an important money crop. Therefore, it is interesting to note the development of apple growing and the conditions affecting it.

The early orchardists found it possible to produce crops of perfect fruit without much care or effort. The virgin soil was fertile and capable of nourishing the trees and produced large specimens of fruit. Insects and diseases were almost unknown to the growers and control measures were unnecessary. After a few score of years the natural enemies of the apple began to attack the tree and fruit causing injury to the crop. Gradually the insects and diseases increased; some followed the tide of migration westward, others found their way into this country from foreign lands, on nursery stock, and still others were driven from the forests that were being cut down and found the apple tree to be an excellent substitute. Methods of controlling these pests were unknown and orchards began to decline and the fruit crops

Thousands of bushels of Apples waiting their turn at Wooster and Johncox Evaporator, Lakeside, N.Y.

of the country were threatened with extinction. Farmers and fruit growers became disgusted and expressed the belief that the land was no longer adapted to fruit growing.

The conditions were far from encouraging but out of it came a new determination, on the part of growers, to invoke the powers of the scientists against the pests that had brought ruin to their industry. The success of such co-operation is evident in all fruit sections.

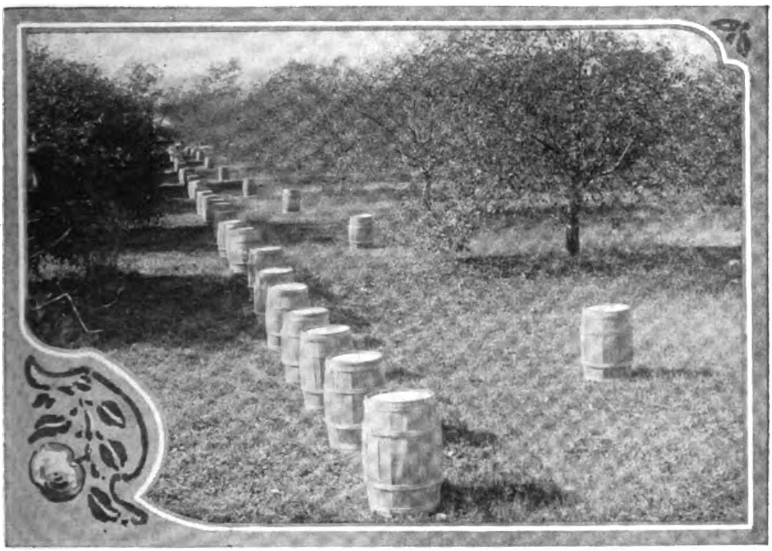
Today, apple growing is on a business basis and the growers who are willing to apply skill, and put energy and careful thought into apple production can reap attractive rewards. The orchardist must be awake to improved methods. He must have a keen sense of business judgment, because the increased cost of production and the marketing problems are vital factors affecting the financial success of fruit growing.

Those who are interested in growing apples for the market should analyze the situation carefully so the relative importance of each phase of the subject may be clearly understood. The economic factors which have influenced the increased interest in fruit growing should be reviewed briefly to give a background for the industry.

There are large areas of land that are better adapted to fruit growing than to general farming. Thousands of farms have rolling land which could be used to advantage for fruit trees. At present it is not only yielding small returns but is washing badly each year and will eventually become waste land if planted to tilled crops.

The demand for fruit is increasing steadily and the proper selection of varieties makes it possible to extend the season of apple consumption throughout the year.

Thousands of old orchards are dying from neglect and the future apple crops are going to be supplied by growers who consider the orchard a productive unit rather than a neglected plot that produces chance crops.



Fertilizer at the rate of 12½ pounds per tree increased the yield per row of these Ben Davis Apples 37 barrels. The row on the left was fertilized at the rate of 12½ pounds per tree and a bale of straw annually, and yielded 46 barels of first grade apples; the other row on the right was unfertilized and only yielded 9 barrels. This proved beyond a doubt that fertilization pays in the apple orchard.

Fruit growing as a business works in well with general farming and the commercial orchard can be operated more economically in that way than any other.

Cool and cold storage make it possible to furnish apples to the market over an extended season and thus increases the business opportunities in apple growing.

Most of the states have to buy apples for home consumption; this fact is the answer to the question of over production.

First class fruit can be grown and marketed in the North Central States at a profit, for less than the freight charges on apples from the Hood River districts to Chicago or New York.

Apple Trees in Blossom. Beautiful Prospects of abundant harvests. With proper fertilization these trees should each yield 15 to 20 bushels of high grade apples.

Today, the commercial spirit pervades the apple growing industry and this condition is justified by economic advantages that prevail. The farmers and growers are insisting that the mature orchards on their land shall pay their way or be cut down. The owners of young orchards are anxious to make the most of their opportunities by taking proper care of the trees and land. Thus, we may see that there is a distinct revival in the business of apple growing.

In discussing the apple industry we may divide orchards into the following classes: The home orchard, the small commercial orchard and the large commercial orchard.

Plowing under sod in the orchard. Organic matter improves the condition of the soil and makes the plant food in the soil more available.

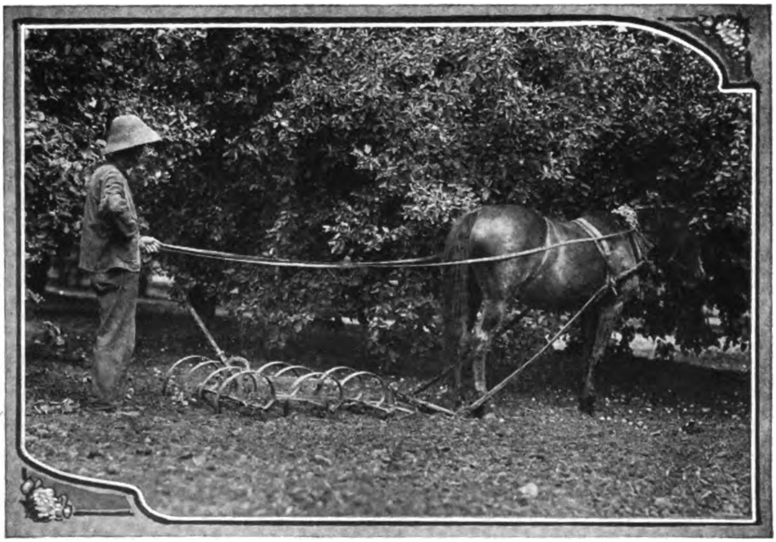
The Home Orchard:

Every farm home should have a home orchard, providing there is enough interest in good fruit to insure proper care of the trees and fruit. It is the function of such an orchard to supply the household with sufficient fruit throughout the year, because plenty of fruit is essential to the best health of the family.

The difference between a home orchard and a small commercial orchard is largely a matter of purpose for which the orchard is maintained. The home orchard should have a number of varieties in it which ripen successively from early to late season. This will provide the household with apples for summer and fall and with plenty for storing.

In view of the fact that most home orchards are neglected it is best for farmers to keep the fact before them, that a few mature trees well cared for will furnish sufficient fruit for family use. It is possible to give a few trees excellent attention without much effort but a large number usually suffer from neglect.

The home orchard adds to the value of every farm and also contributes a year around necessity. The fruit that is not eaten, canned or stored may be made into cider, vinegar and apple butter.



Cultivating with spring-tooth harrow on Purdue Farm, Lafayette, Indiana.

The Small Commercial Orchard:

The work that has been done by different State Experiment Stations in renovating mature orchards on farms throughout the country has clearly demonstrated the fact that a small commercial orchard may be successfully managed as a part of the regular farm business. Such a plan seems to afford the most economical and the soundest business basis for profitable fruit production, because the farm equipment, such as horses, buildings, tools, etc., are already on hand and by the proper adjustment of labor it is possible to spray and harvest the crop with a minimum of extra help. If there is a crop failure greater effort may be given to the other crops on the farm and the farmer's income will not be jeopardized.

The size of such an orchard will depend upon the size of the farm and equipment on hand. Under ordinary conditions the farmer operating a 160 acre general farm should confine himself to twelve acres or less of orchard.

The profits from fruit growing more than justify the small commercial orchard on the farm because the profit per acre can be made to double that received from general farm crops.

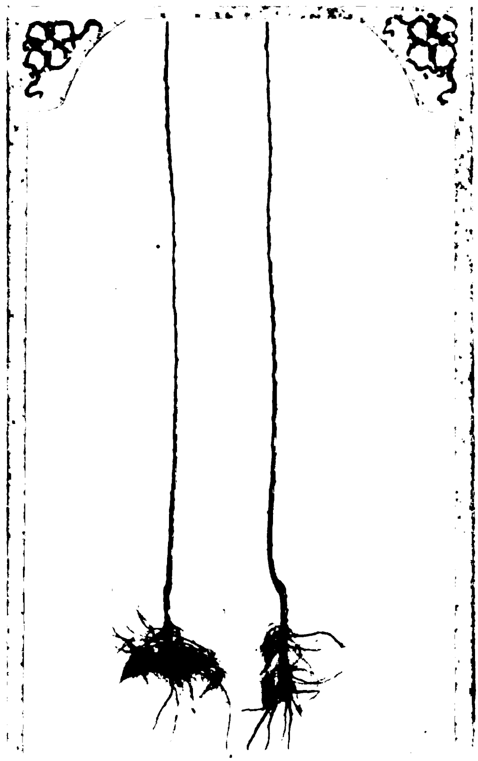
The number of varieties in the commercial orchard should be limited to a few and chosen with respect to harvest dates. It is possible to harvest the fruit with a minimum amount of extra hands by equalizing the acreage of each variety.

Clean cultivation such as this will allow the soil to do its best. Feed your soil as you feed your stock. You can't grow good stock if you starve them, and you can't have good crops if you don't feed the soil.

The Large Commercial Orchard:

Orchards ranging in size from 40 acres upwards are considered large and are usually found on farms where fruit growing is the primary industry. The cost of production per bushel is usually higher in these orchards due to the cost of equipment which is devoted almost exclusively to fruit growing. The source of income depends primarily on the one crop and if it is a failure considerable retrenchment is necessary.

Greater business ability and organization are required to successfully manage a large commercial orchard than a small orchard. On the other hand, the returns from a large orchard properly managed are large enough to warrant the installation of more expensive equipment and in this way the overhead expense is reduced to a minimum.



Straight, clean, and well grown one year apple trees just from the nursery. Roots and stem should be smooth and healthy and the bark unshriveled. For the most profitable orchards it pays to plant only the best stock and to use the best Fertilizer. V-C is the best.

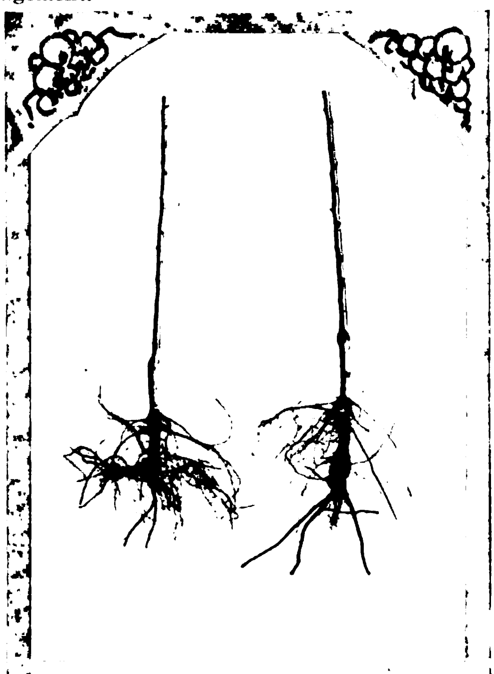
Because of the large profits that are being made by capable and experienced fruit growers operating large and small commercial orchards there is a danger of some who are unacquainted with the problems of apple growing to plunge into the work without grounding themselves well in the fundamentals. The Virginia-Carolina Chemical Company wishes to sound a word of caution to those who would absorb controlling interests in such projects without first acquiring horticultural knowledge and experience.

Establishing the Young Orchard

Cost:

The cost of developing a young orchard depends upon the condition of the land and the amount of labor that must be employed.

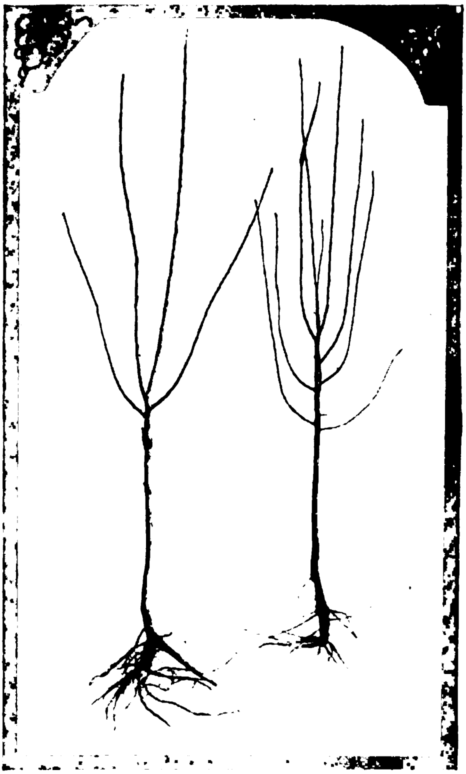
Land that is already cleared and that does not need extra drainage can be planted in orchard much more cheaply than ground that must be cleared. Then, too, if the farmer can do the greater part of the work himself, the cash outlay will not be so great. If the grower's time is to be charged against the work as well as that of his team, it has been found that the expense of the first year varies from $10.00 to $30.00. This includes preparation of the land, laying it off, digging the holes and setting the trees, cost of trees and protectors, pruning and soil management.



The trees shown on page 14, after pruning both top and roots. One of the advantages of the one-year-old tree is that it may be headed low. Many nursery men head apple trees too high for the best results in the orchard. All bruised and broken roots should be pruned away and long roots shortened.

The expense of the succeeding years will vary from $3.00 to $12.00 per acre until it is necessary to begin spraying the fruit. The system of soil management adopted will cause considerable variation in the expense. If the clean-culture-cover-crop system is practiced it is possible to make the intercrops carry the expense and pay a profit in addition.

The records of one successful grower shows that his home orchard of two acres with 40 trees to the acre has cost him in 30 years about $6.00 per tree and during the bearing period of that time has produced about $70.00 worth of fruit per tree. It may be seen that a grower



Two year old trees as they appeared when received from the nursery. The tree on the left still has the label attached; this should be removed to prevent the wire from cutting the tree as the trunk grows. The branches on the tree to the right are arranged better than the branches on the tree to the left, which are fan shaped and too close together on the stem.

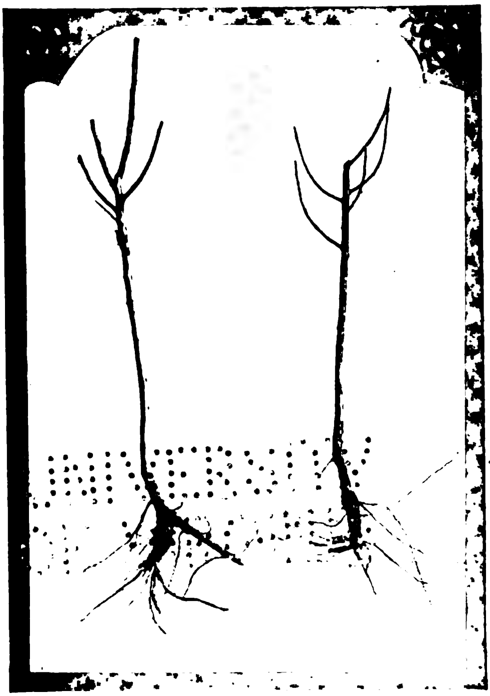
must have sufficient capital to finance his project amply or the costs are likely to discourage him before the trees are mature enough to pay a profit.

General Factors of Location

Transportation:

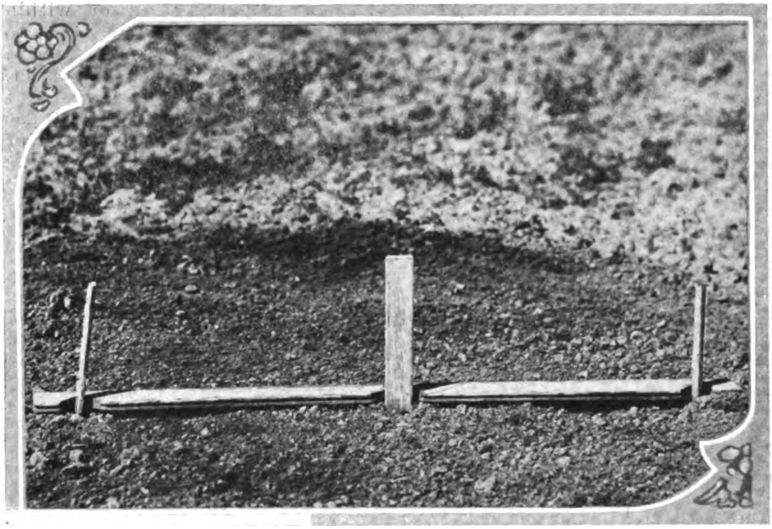
When one is considering planting or renovating an orchard, its relation to the market is a matter of vital importance. The orchard

should be situated relatively near a good shipping point or within easy reach of a good local market or cold storage. Freight rates to the principal markets and frequency of service between points should be considered. It is desirable to have more than one railroad, or outlet, but this is not always possible. If the grower markets his own fruit he must pay the freight and this item varies from $20.00 to $300.00 per car. The length of time that the loaded car is enroute is an item of consideration because the fruit should reach the market or storage as soon as possible after it is packed.



The trees shown on preceding page after pruning. The tree on the left was crowded in the nursery row and the limbs are on two sides and opposite. It is difficult to develop a symmetrical and wellshaped head from such a tree. The tree on the right was not crowded, hence the branches are regularly distributed around the trunk, and the tree will develop a well formed head.

The question of roads must be given careful investigation because bad roads not only reduce the number of barrels that may be hauled at one load but often cause serious damage to the packed fruit, due to jolting and jamming. The promise of a good road is not sufficient to warrant a prospective grower to buy a piece of property. A long haul costs the grower considerably more than a short one, because the number of trips that a team or truck can make between the farm and the loading station affects the cost of marketing. It is safe to say that, up to a certain point, the marketing costs depend directly upon the cost of hauling a barrel to town.



The planting board is a simple device by the aid of which each tree may be set in the exact spot it is intended to occupy. The orchard is marked off by setting a stake where each tree is to be planted. The planting board is then so placed that the notch in its center is occupied by this stake. Other stakes are then driven into notches near the ends of the planting board. The board is then removed and the hole for the tree dug so that its center will be at the point occupied by the middle stake and where the tree is to stand in the hole. The two end stakes are left in place until the tree is placed and partly set.

It has been shown that it costs approximately five times as much to haul a load over a rough dirt road as it does over a smooth macadam road.

A Man and Team can Haul	*No. of Barrels*	*Cost per Mile of Travel*
On rough, bad country roads.......	8 to 10	.25 to .35
On smooth macadam roads..	20 to 28	.10 to .25

The supply of available labor is very important if the orchard is large and the presence, in the neighborhood of other commercial orchards is desirable in many ways.

It is obvious that the above items affect the commercial orchards rather than the home orchard.

Soil:

The apple will thrive on a wide variety of soils varying from the light loam to the heavy clay loam soils. Some varieties seem to do better on one type than another and this matter should be considered in selecting varieties. Nearly any soil well suited for general farming is a good apple soil. It should be well drained and contain sufficient available plant food and organic matter to insure a strong, thrifty growth. A clay subsoil is to be preferred. Care must be taken to avoid shallow soils where unbroken rock comes near the surface, and soils underlaid with an impervious hard pan. The light sandy soils, the heavy white clays and the muck soils should also be avoided as locations for commercial apple orchards.

The hole into which the tree is to be set should be neither too large, too small, too shallow nor too deep. The root system of the tree should be comfortably accommodated. The top soil is placed to one side and the subsoil in another pile.

Site:

After determining that soil conditions are satisfactory it is necessary to choose the exact location of the orchard site with reference to air-drainage and exposure. Because of the fact that cold air moves

from higher levels to lower levels the land upon which the trees are to be planted should be higher than the surrounding country. Lowlands, valleys and "pockets" from which the cold air does not escape should be avoided because the trees will be subject to frost injury during blooming periods. The cold air flows away from the higher lands and collects in hollows and on low, flat lands causing frequent crop failures.

Gentle slopes insure good air and surface drainage but steep slopes are not so well adapted to commercial fruit growing because of the

When the hole is dug and the tree is to be set the planting board is replaced with its end notches occupied by the two stakes. Finely pulverized topsoil is then spread over the bottom of the hole, the tree placed vertically in the middle notch of the planting board with its roots spread in their natural position. The tree should be set 3 to 5 inches deeper than it stood in the nursery row. More good soil is then placed about the roots and firmly pressed down so that every root is in contact with fine soil. When set the planting board is removed.

greater expense of management. The choice of exposure will depend upon local conditions. From the standpoint of its effect upon blooming periods and color it may be said the exposure is not an important matter. If the orchard is in the vicinity of a large lake it would be advisable to take advantage of the slope in the direction of the lake. If the country is subject to high winds in the fall it is advisable to utilize a slope in the opposite direction from which these winds prevail.

Selection of Varieties

The choice of varieties must be governed by a number of important factors. All varieties planted must be adapted to the community in which they are to be grown. The experience of growers in the locality should be studied and the advice of the State Experiment Stations and State Horticultural Society should be requested.

Because the purpose of the home orchard is to supply fresh fruit over a long season it is necessary to plant varieties having a succession of ripening dates ranging from early till late season. Personal tastes and preferences will govern the final selection.

More soil is added and firmly packed down with the feet and still more soil and more packing until the hole is a little more than filled.

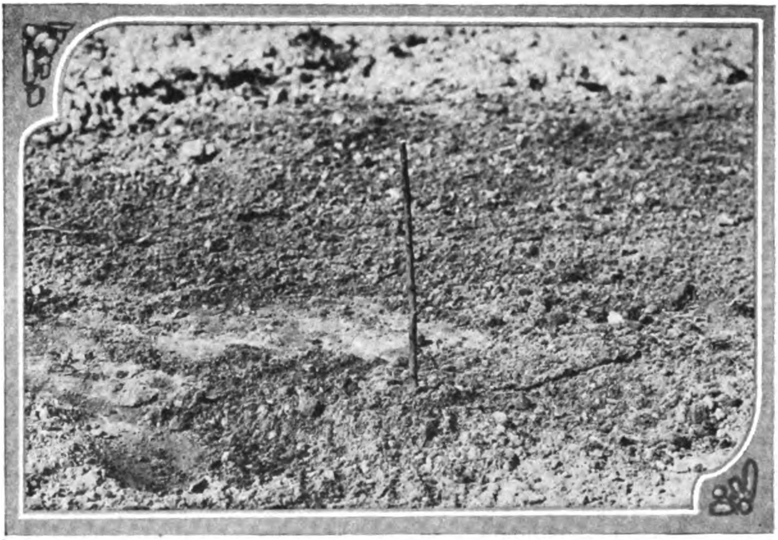
The commercial grower must consider the preferences of the markets he is to supply. He should choose three or four standard varieties rather than a large number, because there is usually more money in marketing a large quantity of a few standard varieties that the consuming public are acquired with, than there is in a smaller amount of a larger number of varieties. The varieties chosen should be heavy and regular bearers and the trees should be vigorous and hardy. The fruit should have good keeping and shipping qualities, good color and be fairly resistant to disease.

Unknown varieties and novelties should usually be avoided.

The following list gives suggested varieties and notes of description.

Yellow Trasparent.—An early variety ripening in July and August, yellow in color and bears early crops regularly. Fruit ripens unevenly and must be handled very carefully. Tree susceptible to fire blight and collar rot.

Benoni.—Ripens a little later than the Transparent, good quality, medium size; color, red or yellow background.



This is the tree after the planting is done. It has been set about four inches deeper than it stood in the nursery row. When spring comes new shoots will appear all along the trunk and all but four or five of those near the top should be rubbed off when two or three inches long.

Duchess of Oldenbury.—Profitable early cooking apple, medium to large, red striped, fruit ripens just after the Benoni. Tree hardy and vigorous.

Wealthy.—Bright red apple of good quality which comes into early bearing. Popular for home or market use. Apparently susceptible to winter injury.

Maiden Blush.—Well known variety of good quality and size, pale yellow color with pink cheek. An early and reliable cropper. Fruit ripens just after the Wealthy.

Jonathan.—This variety ripens during the latter part of September and is known to be one of the best apples on the commercial market. It has a brilliant dark red color and is of the highest quality. The fruit is slightly susceptible to Jonathan Spot.

Grimes.—Probably no other yellow apple so well occupies the market standing in the eastern part of this country. The Grimes is rich in quality and color, bears fairly early and is a highly profitable variety to grow.

Winter Banana.—This apple is pale yellow with a red blush, medium to large in size, and yields moderately heavy crops. Must be handled very carefully.

Delicious.—Dark red fruit on yellow background. Large in size and of good quality; is a reliable bearer and seems to be a very good commercial variety.

Rome Beauty.—This is a standard winter variety of medium to large size, good quality and color. An excellent variety in a commercial orchard but must be matured when picked if long storage is anticipated.

Hubbardston.—The red and yellow variety of market standing bears large apples and produces heavy crops almost annually.

Baldwin.—This is a most popular apple in the northen fruit belt. It is a large, red apple of good quality, rather slow in coming into bearing. It has a strong vigorous tree, well adapted to the northern sections.

Rhode Island Greening.—A popular variety in the northern fruit belt. Tree vigorous, and healthy; fruit has a good market standing, bears heavy annual crops.

Akin.—This is a red striped variety, bears fairly early and gives reliable crops; good quality and an early bearer.

York Imperial.—A late commercial variety of fair quality, tree vigorous and regular bearing. Apple is lop-sided in shape.

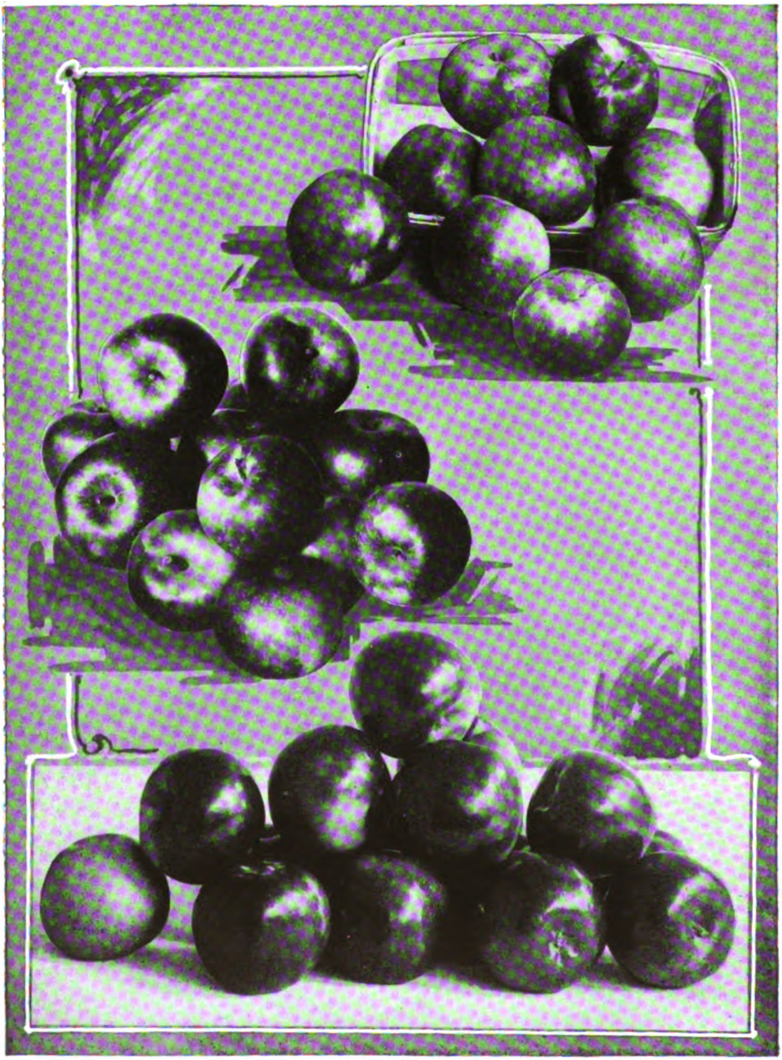
Stayman Winesap.—An excellent commercial variety, dull red over green in color, apple of good quality, medium to large in size and tree is reliable and annual bearer.

Winesap.—Dark red apple of excellent quality, apple small in size; tree bears young and is reliable quality.

Ben Davis.—Yellow or red colored variety, medium to large in size, and abundant cropper. This apple is noted for its ability to stand handling and to ship well. It can be kept in storage a long time but does not have particularly good quality.

Gano.—Similar variety to Ben Davis, rather dark in color, season practically same as that ot the Ben Davis.

Such varieties as the Rhode Island Greening, North Western Greening, Northern Spy, and Baldwin are not adapted to growing in the southern third of the fruit belt because of the fact that they ripen early and lose their quality.



Jonathan, Baldwin, and King David varieties. These three varieties are well suited for growing in most sections of the United States.

Nursery Stock:

The grower should purchase his nursery stock of a reliable and established firm and should make every effort to obtain trees that are well grown and of good size and shape for the age and variety. The trees should be true to name and free from insects and diseases; their appearance should indicate that they are healthy and have been properly cared for after being dug from the nursery row.

One year old stock is usually recommended for planting because they suffer less from transplanting, they are more easily trained and are usually cheaper. Either one or two year old trees may be set but older trees should not be accepted.

It is false economy and bad judgment to buy cheap trees from an unreliable travelling tree agent because many of them deliberately misrepresent the stock they sell and their customers are usually disappointed after the trees begin to bear.

Spring or Fall Setting:

If the prospective grower studies over all arguments on this subject he would suffer from bewilderment. It is common practice for the northern growers to set their trees in the spring while those growers of the central and southern belt may set trees in either spring or fall. A dry, open winter is injurious to newly set trees and there is danger of ice forming around the crowns and injuring them. The advantage of setting trees in the fall is that the roots have ample time to callous over and the work may be done during slack periods on the farm. If the young trees are purchased early in the winter good stock can be obtained and it can be delivered at any specified time.

Care of Trees Before Setting:

If the young trees are received during temperate weather they should be heeled in promptly by placing them in a shallow trench and covering the roots firmly with fine moist earth. The trees should be unpacked carefully and all bundles untied so that each tree is separate. These are laid in a shallow trench, which has been opened up with a plow, in a slanting position with the tops to the south and then sufficient dirt is put on to protect the roots and crowns.

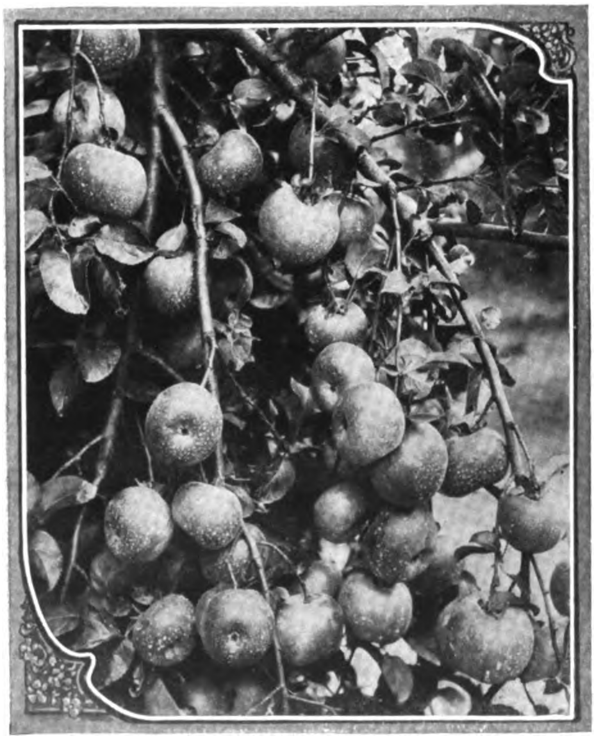
Trees received during freeing weather should be placed in a cool, damp place to thaw out gradually before unpacking and heeling in. A rabbit-tight fence should be placed around the place where the trees are heeled in.

Distance Apart:

Experience and exhaustive experiments have demonstrated the fact that permanent apple trees should be set at least 36 to 40 feet apart. If the trees are crowded the yield of fruit is greatly reduced and spraying, cultivation and harvesting operations are much more difficult. Some upright growing varieties, such as the Yellow Transparent and Benoni, could be set closer than the standard spreading varieties.

Planting Plan:

The grower must choose the square or triangular systems of planting his trees because these are the only practical plans for ordinary use. The square system is most commonly used because it is simple to lay out and facilitates the work in the orchard as well as intercropping while the trees are young. In this system the rows are an equal distance apart and the trees are the same distance apart in the row.



Some well sprayed and well fertilized apples on Mr. James Craigs' orchard Waynesboro, Virginia V-C is used on all the trees of Mr. Craig and he is very enthusiastic over the results.

The triangular (or hexagonal) system makes it possible to plant about 10% more trees per acre but the inconvenience caused by this system generally operates against its adoption.

Preparation of the Soil:

The contour of the orchard site and the system of orchard management to be practiced later will affect the method of preparing the soil for planting the young orchard. Land that is comparatively level and which may be plowed without danger of washing, may be prepared by plowing and disking a few months before planting time. If fall setting is anticipated the ground should be worked early and sown to cover crops in August. If the orchard site is hilly so that cultivation is not advisable, because of the tendency of the soil to wash, the trees may be set in holes that are dug in the sod and trees of this kind should be carefullly and thoroughly mulched with cut grass, straw or weeds to prevent the evaporation of soil moisture.

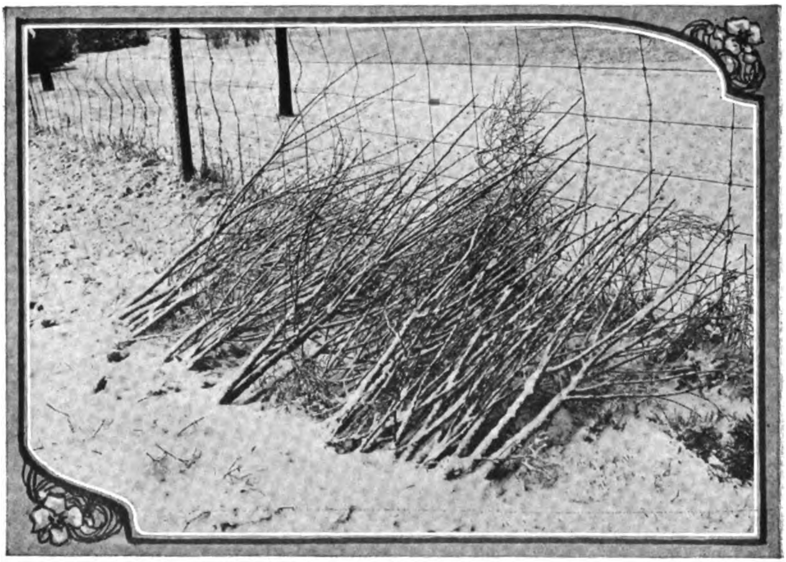
No plant food wasted in this cleanly cultivated orchard. Weeds are heavy feeders and take away from the trees plant food which rightfully should go towards making heavier yields and better quality of fruit.

This is accomplished by making a mulch collar around the young tree heavy enough to kill the grass under it. Care must be taken to keep the material away from the tree at least several inches. If the ground can not furnish enough mulching material, extra straw or grass should be secured. The adoption of the clean-culture-cover-crop system is usually advisable on land that can be cultivated and this system makes possible intercropping with vegetables between the rows of trees. This method will ofttimes pay a profit on the land while the trees are coming into bearing.

Trees managed under the sod-mulch system may suffer more from field mice than when the clean-culture-cover-crop system is practiced and for that reason tree protectors should be put on immediately after planting.

Method of Planting:

When the grower is ready to set the trees, they should be taken from the place where they are heeled in and the injured and diseased roots pruned off with a sharp knife or pruning shears and then dipped into thin mud to prevent them from drying out. The tree should then be set as soon as possible in a hole which is large enough to accommodate the root system when spread out. The tree should be set an inch or so deeper than it was in the nursery row.



Trees heeled in this way escape damage from the rigors of winter.

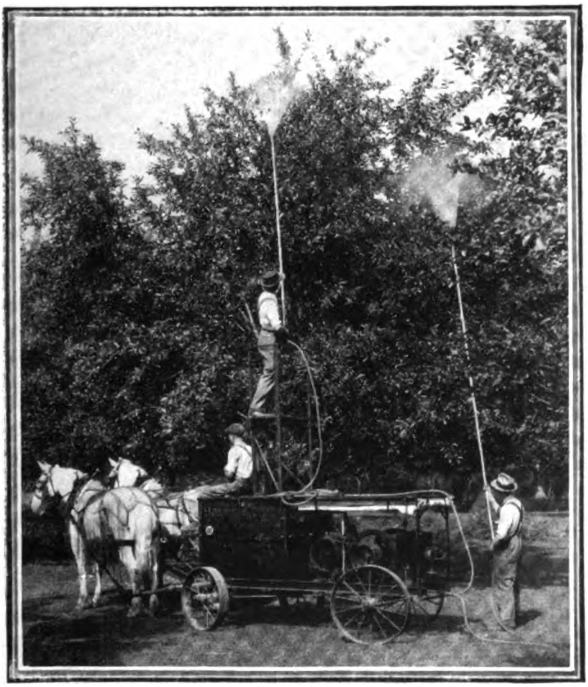
The top soil should be firmly tamped about the fine roots and when the hole is two-thirds filled the soil should be well firmed about the tree by tramping.

If the soil does not contain an ample supply of available plant food two or three pounds of V-C complete fertilizer should be mixed with the soil to insure a strong, vigorous growth.

A tree protector of some description should then be put on to prevent rabbits and mice from injuring the bark. There are many different kinds of protectors varying from newspaper, which is wrapped around the tree and tied in place, to wood veneer and wire screen.

Pruning the Young Tree:

Pruning is important because a well developed tree may be sprayed and picked more economically than an untrained tree. The central leader system of pruning is being adopted quite generally now because it develops a stronger head with a greater bearing surface. The initial pruning is given the first spring before time for the buds to swell. On a yearling tree this consists of cutting the tree to a whip about 36 inches high. The second season about four scaffold limbs are selected that are well placed on the trunk and the balance are removed. No two limbs should be opposite each other and they should be well spaced around the tree, with each limb at a different height from the ground.



For large orchards a power sprayer such as this will pay for itself in a short time. Keep your trees healthy and feed them well and the profits from your orchard will surpass your fondest hopes.

The pruning in succeeding years will consist of thinning out the interfering branches and developing a well balanced top. The top must be open enough to permit the entrance of plenty of sunlight and air. Water-sprouts should be kept off of the tree and care should be taken to see that diseased wood is removed.

Companion Cropping in the Young Orchard:

In young orchards where the clean-culture-cover-crop system of management is practiced it is profitable to plant such cultivated crops as early potatoes, tomatoes, and truck crops such as cabbage, beans, peas, beets, etc. These crops can be grown and removed in time to sow a cover crop such as rye which will survive the winter, hold the ground, add organic matter to the soil and take up the plant food that becomes available during the winter season. Strips of ground five or six

Buckwheat used as a cover crop in mature orchard. V-C Fert lizers applied to the cover crop will increase its growth and value to the orchard.

feet wide should be left on each side of the trees so that thorough cultivation may be given them from the time the cover crop is turned under until the cover crop is sown in the late summer. These truck crops will pay a high profit on a liberal application of fertilizer and soil improvement will result which will promote vigorous development and early bearing of the trees.

Strawberries and bush fruits may be grown between the rows but are not as satisfactory as the aforementioned truck crops. It is not advisable to grow hay or grain crops in the young orchard which do not permit clean cultivation and the sowing of a late cover crop.

Orchard Management

A discussion of the soil management of an orchard applies to both the young orchard as well as the mature or renovated fruit farm. The successful development of an orchard depends upon giving it good care and management at all times. The trees cannot be expected to take care of themselves and yield profitable returns. Orchards should not be planted or reclaimed in a burst of enthusiasm that will subside before the trees come into profitable bearing because such action will only result in loss and disappointment. With foresight and determination on the part of the grower the orchard can be made very profitable and deserves the consideration of the general farmer who has rolling land or land that lies above the surrounding country.

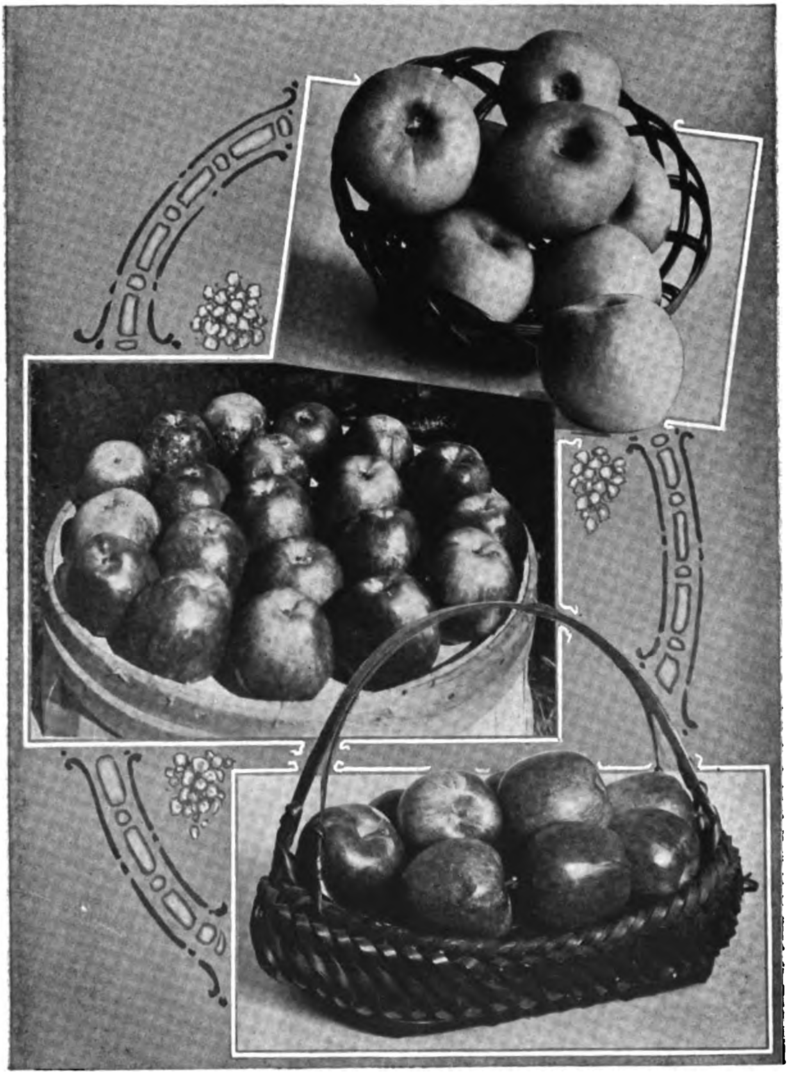
One interested in orcharding should be acquainted with the two most successful systems of orchard management, known as the clean-culture-cover-crop system and the sod-mulch system. The objects of these systems are to conserve the soil moisture and increase the fertility of the soil and either system will accomplish the desired end if properly carried out.

The choice between the two systems will depend upon the condition of the soil; whether or not the orchard is too rolling to cultivate and the availability of a sufficient supply of cheap mulching material.

The Mulch System:

On rolling land which is liable to wash, the mulch system should be adopted. In young orchards managed under this system the grass is cut three or four times a year, raked up and spread out around the young trees making a mulch collar eight to twelve inches thick. Care should be taken to keep the material away from the trunk of the tree at least ten inches. If the soil is not productive enough to grow sufficient grass, the field should be disked, fertilized and harrowed to improve the growth. Reseeding with orchard grass may be done if the stand of grass is not good. The mulch collar around newly set trees should be about six feet in diameter and this is gradually increased as the trees get older. If it is impossible to cut enough grass for the mulch at first, use straw, stubble clippings and cut weeds for the mulching material. It is practically impossible to grow enough material in a mature orchard and it is therefore necessary to supplement it with outside material. A well grown fifteen year old tree will require at least two bales of straw, or an equal amount of leaves, grass or weeds to make sufficient mulch.

Properly done, this system is very satisfactory because it conserves the moisture and the ground is always in good condition for hauling or spraying. An application of five to ten pounds of fertilizer per tree applied in the spring before mulching the first time is advisable in most orchards. It is necessary to guard against fire and mice injuring the trees when this system is practiced.



Top—Colorado Greenings. Bottom—Starks Delicious.

Centre—20 V-C Fertilized apples that cover the top of a barrel. Any grower might justly be proud of such fine apples as these. Use V-C for your trees and you can have the splendid yields and high quality of fruit that other V-C Fertilizer users are getting right along.

Clean Culture Cover Crop System:

This method involves plowing or disking of the orchard every spring and cultivating it like a corn field until time to sow the cover crop. If the orchard is slightly rolling the plowing should be done with the contour of the land to prevent washing. The cultivation can be done with disk harrows or spring tooth harrows and it is important to cultivate as soon as possible after every rain or at least every two weeks until time to sow the cover crop. Care must be taken in cultivating so that the trees will not be injured by the teams or implements.

This system is eminently satisfactory and may be employed in a large per cent of the orchards.

Damage from heavy frosts can be prevented in a large measure by the use of these orchard heaters, which are inexpensive to make and operate in proportion to the crop often saved.

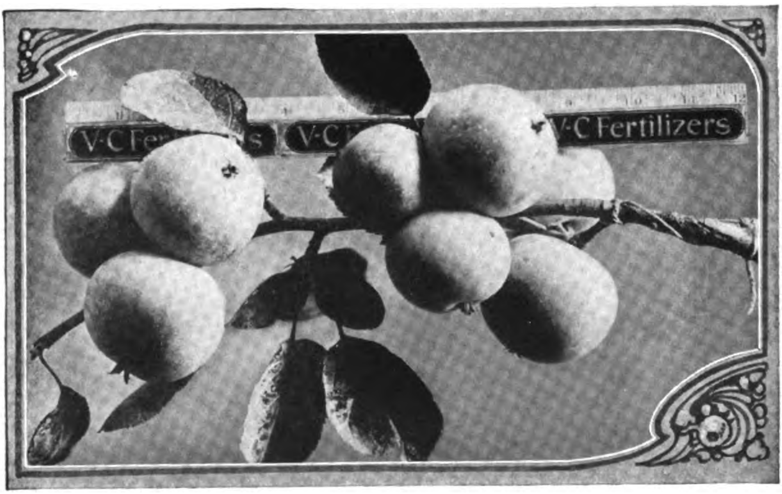
Cover Crops:

The continuous cultivation of any piece of land will burn the organic matter out of the soil unless manure and green crops are turned under to replenish that which is lost. An abundant supply of humus is as essential to good crop production in the orchards as it is to a crop of corn because the decaying organic matter assists in making plant foods available to the trees. It also makes the soil more friable and increases the ability of the soil to maintain the best condition of soil moisture. Likewise, the maximum benefits of fertilizers are obtained on soils well supplied with humus, and it is therefore important that some crop be sown in the cultivated orchards during the latter part of the summer.

It is preferable to use a crop that will live through the winter and which is adapted to a wide variety of soils. General experience has proven rye to be one of the best cover crops because it can be sown as cheaply as any and is more likely to give a satisfactory stand than most crops. Vetch is often recommended but the seed is expensive and it is hard to get a catch on many soils. In the sections enjoying mild winters, crimson clover may be used successfully.

Many orchardists use cowpeas, soybeans, millet, or buckwheat very satisfactorily but these crops are not winter-surviving and cannot utilize the plant food that becomes available during the winter and early spring, therefore, such a crop as rye is often given preference.

It is evident that a rank growth of the cover crop is desirable in order to obtain the maximum amount of organic matter. This can best be accomplished by making a liberal application of complete fertilizer when the cover crop is sowed.



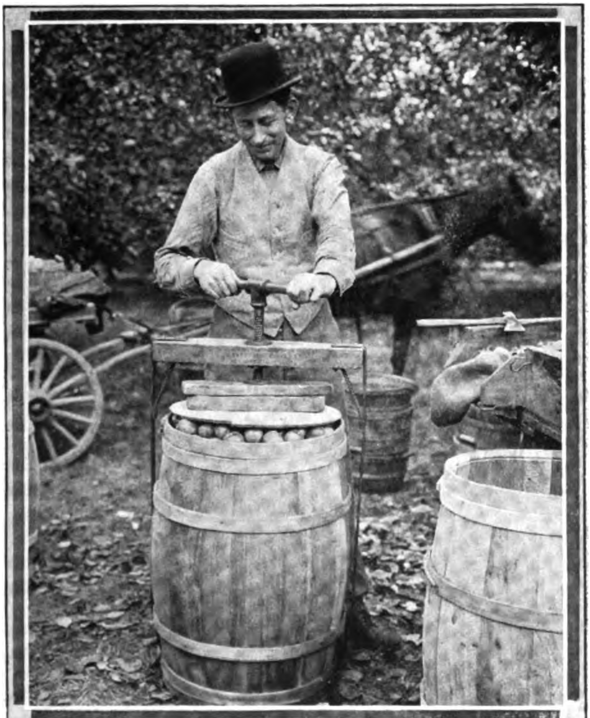
Eight Stayman Winesap apples in "Rose Cliff" orchard of James Craig near Waynesboro, Virginia. Mr. Craig uses V-C in his orchards.

Fertilizing the Orchard

Fruit trees demand a large amount of available plant food to insure regular and profitable crops. The trees remain in a fixed position and the orchard must receive good soil management if maximum results are to be obtained.

Grain crops are rotated and fertilized to increase the yield and the orchard should receive the same consideration because the profits per acre are greatly increased by the treatment. If plant food and organic matter are not added to the soil the trees must compete with the grass and weeds for an existence and irregular crops are the result.

The alternate bearing habit of many thousands of orchards is the result of the trees exhausting the supply of available plant food when bearing heavy crops and not having sufficient energy to mature the fruit buds for the succeeding season. To overcome this condition it is available to apply from 200 to 500 pounds of V-C complete fertilizer per acre containing 2 to 4 per cent available nitrogen, 8 to 10 per cent of phosphoric acid and 2 to 8 per cent of potash.



The finishing touch. The farmer who realizes that Fertility and greater profits go hand in hand, and applies his knowledge will succeed in no small measure.

Proper development of trees and plants depends upon having a supply of all elements required by the tree for growth in sufficient quantities to meet the maximum demands. The elements which are usually deficient are nitrogen, phosphorus and potash.

Nitrogen influences the wood growth and fruit bud development. Trees receiving an ample supply of this element show a healthy, dark green color in the leaves and an annual growth of ten to twenty inches. The leaves are the lungs of the tree and a healthy leaf development contributes to the vigor and thrift of the tree.

Phosphorus is one of the most important of available elements and enters into the development of all phases of tree and fruit production. The fruit utilizes considerable amounts of phosphorus in maturing the seeds and fruit buds.

Potash is demanded by the tree for the production of wood and fruit. It is known that this element influences the color, firmness and flavor of the fruit and is quite important in the physiological process of the tree. When this element can be obtained at normal prices it is used extensively in orchard fertilization.

The fertilizer should be applied in the spring before the ground is plowed or the mulch put on. The application will depend upon existing soil conditions. Young trees should receive from two to five pounds annually, the amount increasing as the tree becomes older. Mature trees should receive from 10 to 25 pounds each. A light application of nitrate of soda just before blooming time is often a profitable supplement to the regular fertilizer.

The fertilizer is distributed by hand under the spread of the tree. Do not make the mistake of putting it up close to the trunk.

Bulletin No. 240 of the Ohio Experiment Station reports an average gain of $4.72 per tree from the use of nitrogenous fertilizers costing about 15 cents per tree.

Bulletin No. 121 of the Pennsylvania Experiment Station shows the convincing results obtained in an experiment orchard. Four years results, on one plot which was fertilized with a complete mixture, shows a total of 17,127 pounds of apples as compared to 4,557 pounds on a similar plot beside it which was unfertilized.

In other test covering a four years period a fertilized acre produced 513.8 bushels of apples as compared with 135.7 bushels on an unfertilized acre in the same orchard.

Bulletin No. 151 of the West Virginia Experiment Station reporting an apple survey of Berkeley County shows that 19.8 per cent of the acreage in young orchards is given manure and 49.2 per cent receive applications of chemical fertilizer.

Of the bearing orchards reported over 52 per cent received commercial plant food.

These figures are evidence of the importance and profitableness of proper fertilization and are worthy of the earnest thought of every grower.

Renovation of Old Orchards

There are mature orchards throughout the apple growing sections which are neglected but fairly healthy and it has been demonstrated that thousands of these orchards may be made highly profitable by proper pruning, spraying, fertilization and orchard management. If the trees are situated on a good site, and at least one-half of them are in good healthy condition, it would be advisable to undertake to renovate the trees.

The dead and weak trees should be removed and the remaining trees pruned during the fall or early spring. It is not desirable to try to prune too severely the first year. It is better to extend the pruning over 3 years and in this way the shock will not be so great. The pruning the first yeai should consist of cutting out the dead and

diseased wood, water-sprouts and interfering branches. The top should be opened up so the sunlight may reach the inside branches. Later pruning will make it possible to remove the higher limbs so the tree may be blocky and low. When pruning, cut close to the remaining limb so that no stub will be left.

A strong winter spray should be applied before the buds begin to swell to kill any resisting spores and scale insects that might be present.

The orchards should be plowed about 4 inches deep, if the land is not too rolling, and cultivated until time to sow the cover-crop. If the annual growth has been short, indicating a starved condition of the tree, 500 pounds of V-C fertilizer should be applied and worked into the soil to increase the vigor of the trees.

Modern methods are used in many orchards. This power sorter saves time and labor and the grading is accurate. They believe is using the best, and so use V-C Fertilizers.

If the land is too rough to cultivate, the trees should be mulched with straw, grass, etc. to conserve the moisture. Proper spraying should be given the trees and fruit during the summer to protect it from diseases and insects.

Spraying Mature Orchards:

Spraying is perhaps the most important feature in the production of perfect fruit and the lack of proper spraying has been the cause of more growers losing interest in their orchards than any other one factor. The cost of spraying a tree throughout the season varies from twenty to forty cents in normal times and the results soon demonstrates the importance of it. The keynotes of good spraying are thoroughness and punctuality and every attention should be given to see that the spray material is applied according to schedule. The practice varies in different localities and it is advisable to ask the State Experiment Station for advice on this subject.

The general practice is to use lime sulphur solution at 5 degrees Baume or a miscible oil at proper dilution for the dormant or winter spray to control scale insects.

For summer spraying lime sulphur solution diluted to 1 degree Baume and arsenate of lead or 4-6-50 solution of Bordeaux mixture with arsenate of lead are used to control the diseases and insects. One pound of powdered arsenate of lead or two pounds of paste arsenate of lead to 50 gallons spray solution is used to control the insects, while the lime sulphur or Bordeaux is used to control the diseases.

The first application of the summer spray is given when the leaf buds burst. This spraying is for the control of the scab, canker worms, budmoths, etc. If the orchard is subject to attacks of green aphis it is advisable to add 1/3 pint of nicotine sulphate to each 50 gallons of spray material.

The second summer spray is applied when the petals fall and is primarily for the control of the first brood of codling moth, but also protects the fruit from circulio, scab, green apple worms, etc.

The third summer spray is applied two to three weeks later and if the fruit is usually affected with blotch or bitter-rot, Bordeaux mixture and arsenate of lead should be used.

The fourth summer spray is put on about four weeks after the time for the third and if blotch and bitter-rot are prevalent in that section Bordeaux mixture should be used as recommended for the 3rd spray.

The fifth summer spray is applied three to four weeks after the fourth spray and the same materials are used. Blotch, the second brood of codling moth and the rots are controlled at this time.

In the case of young trees which have not yet come into bearing, two sprayings per year should be sufficient to keep the foliage in good condition. These are applied just after the leaves open out and then again about the first of July.

Harvesting and Marketing:

The condition of the fruit is an important factor at this time. The market does not want poorly colored, bruised, imperfect fruit. Careful pruning and spraying will produce fruit of good color and free from imperfections; careful picking and packing are equally necessary. The fruit should be picked by hand into good picking baskets and handled at all times like eggs, because bruises or cuts will affect the market value and prevent storing. As soon as the fruit is picked it should be graded and packed in boxes or barrels. The barrel is the most important package east of the Rocky Mountains and can be generally recommended. The top head of the barrel is nailed in and the bottom knocked out. The first layers that are packed are usually faced and the balance filled in carefully. The barrel should be rocked occasionally to settle the fruit well and then filled an inch above the hoops before pressing the bottom head in. This should prevent the barrel from becoming slack after it is packed.

Keep the packed fruit cool and dry.

The marketing may be done locally or the fruit may be sold to buyers, commission men or stored. These problems must be settled according to conditions and localities.

An honest pack is essential to good marketing and the adoption of a good label is advisable so the public may learn to know your product; in due time they will pay a premium for your first class fruit.

INDEX.

List of Free V-C Crop Books

EVERY land owner and farmer will find these illustrated Free Crop Books of intense practical value, for they point the way to greater Prosperty on the farm, which means "increased yields per acre" and *better* crops.

The following list of Crops shows how extensively these Books cover every crop that may be profitably grown in the South. If you are interested in one or more of these, fill out the Free Coupon on the opposite page:

Alfalfa
Apples
Apricots
Artichokes
Asparagus
Barley
Beans
Beets
Berries
Blackberries
Cabbage
Cantaloupe
Carrots
Cauliflower
Celery
Cherries
Clover
Corn (Green)
Corn (Fodder)
Cotton
Cowpeas
Cucumbers
Dewberries
Egg Plant
Frames (Cold)
Fruits
Garlic
Grape Fruit
Grapes
Grasses
Green Corn
Hay
Hot Beds
Irish Potatoes
Leek
Lemons
Lettuce
Melons
Millet
Nectarines
Nuts
Oats
Okra
Onions
Oranges
Orchards
Parsnips
Parsley
Pecans
Peaches
Pears
Peanuts
Peas
Peppers
Pineapples
Plums
Potatoes (Irish)
Potatoes (Sweet)
Pumpkins
Radishes
Raspberries
Rice
Rye
Shallot
Snap Beans
Sorghum
Spinach
Squashes
Strawberries
Sugar Cane
Sweet Potatoes
Tobacco
Tomatoes
Trucks
Turnips
Vegetables
Watermelons
Wheat

BY SIMPLY placing check marks (√) on the Free Coupon below in the square opposite such books as you may want, and then mailing this Coupon to the address below, after also indicating the number of acres you will plant and cultivate, such Books as you have indicated will be sent you *free* without any obligation on your part. *Address:*

CROP BOOK DEPARTMENT

V-C Fertilizers

Box 1616 **RICHMOND, VA.**

CUT ALONG THIS LINE

FREE V-C CROP BOOK COUPON

Please send me Free Crop Books as per my check marks (√) in squares below. The number of acres of these crops I will plant and cultivate are:

☐ **CORN** .... acres	☐ **RYE** .... acres
☐ **COTTON** .... acres	☐ **RICE** .... acres
☐ **TOBACCO** .... acres	☐ **NUTS** .... acres
☐ **VEGETABLES** ...... acres	☐ **HAY** .... acres
☐ **STRAWBERRIES** ... acres	☐ **ALFALFA** .... acres
☐ **FRUITS** .... acres or trees	☐ **CLOVER** .... acres
☐ **WHEAT** .... acres	☐ **MILLET** .... acres
☐ **OATS** .... acres	☐ **SUGAR CANE** ...... acres
☐ **BARLEY** .... acres	☐ **SORGHUM** .... acres

Name____________________________

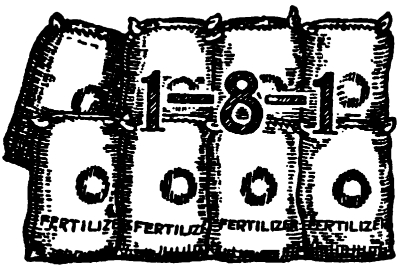
Address____________________________

Dealer____________________________

Address____________________________

Fertilizers of
High Grade Analyses Save Time, Material, Labor and Money

Low Analysis



High Analysis

THESE two piles of fertilizer—eight bags on the left, five bags on the right—contain exactly the same amounts of plantfood.

High analysis fertilizer saves three-eighths, or more of the *freight cost*—freight on five tons or less, instead of on eight tons.

High analysis fertilizer saves three-eighths, or more of the *hauling costs*—five trips to the warehouse instead of eight or more.

High analysis fertilizer saves three-eighths, or more of the bag costs—five bags instead of eight.

Finally, high analysis fertilizer saves at least three-eighths of storage costs.

Why not get the most for your money?

Save Money in Buying Fertilizer—Order Analysis Containing Fourteen percent. or over of Plantfood

APPLES

T. J. Drake, Big Clifty, Ky., states: "We have been using Fertilizer for many years, and have tried many different brands, but for the past three years have been using V-C Fertilizer, and it has given us entire satisfaction. We have the best crop that we have had in years, and it gives us pleasure to speak a good word for V-C Fertilizer."

A. V. McGill, Spring Lick, Ky., says: "We have been using Fertilizers for many years and have tried many different brands. For the past three years have been using V-C Fertlizers, and they have given us entire satisfaction."

Noel E. Cundiff, Solway, Ky., writes: "I have used many different brands of Fertilizer in the past few years and for the last two years have been using V-C Fertilizers. This season I have the best crop I have ever grown. I can cheerfully recommend V-C Fertilizers."

FOR SALE BY

Sundry

The Boll-Weevil and How To Fight It

Published by

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RICHMOND, VIRGINIA

What Users of V-C Fertilizers Say

DOUBLES THE YIELD OF BOTH:

"I have used V-C Fertilizers, both for Corn and Cotton, at the rate of 200 lbs. per acre, for the last 4 years and find that it doubles the yield of both. Have also used V-C Fertilizer on Potatoes with satisfactory results." W. T. YOUNG, Bauxite, Ark.

GOOD ALL AROUND:

"We have been in the Truck business the past ten years, and have used a great many different kinds of Fertilizers. We bought of you last Spring one car of V-C Fertilizers, and have had fine results. We find it especially good for Cotton, Corn, Tomatoes and Canteloupes." SMITH & GORE, Tyler, Texas.

LOOKS GOOD TO HIM:

"Virginia-Carolina Fertilizers used on both Corn and Cotton looks now like the yield might be nearly doubled." S. M. BRANEY, Cabot, Ark.

PROVED IMMENSELY SATISFACTORY:

"We used V-C High-Grade Fertilizer as a first application on both Cotton and Corn, which proved immensely satisfactory, especially on the Corn. We have also used several seasons your 16 per cent acid, with which we are very much pleased, using the same with meal and kainit for a second and third application." E. M. & A. P. WILSON, Columbia, S. C.

EXPERIMENTED WITH SIX OTHERS:

"I experimented with six different leading companies' Fertilizers. From results obtained, I was thoroughly convinced that I had found the goods I wanted in V-C Fertilizers. I have been able to increase my yields on Cotton and Corn per acre 33 1-3 per cent from the use of your goods, which beat any and all others. In addition, I have found your company and your goods thoroughly reliable and superior to all other Fertilizers sold in this locality. I want no other Fertilizers as long as it holds as good as it is. Other Fertilizers have come and gone since I commenced to use V-C Fertilizers, but I get such splendid results every year from V-C Fertilizers I do not expect to use any other kind." T. W. SHACKLEFORD, Kellyville, Texas.

BEST THEY EVER USED:

"I desire to compliment you on your High-Grade V-C Fertilizer sold us this season. We have all the evidence in hand to make us believe that your goods are the best we ever used. Without doubt I'll make a bale of Cotton and 40 bushels of Corn to the acre where I'm using 400 pounds to the acre. This is only average land for my section, and the yield is double what it usually is. Will also state that I have known personally your goods for a number of years, and will testify that they have always been high grade—"Standard" all the time. Your brands for Truck and Vegetables I find excellent. We'll use your goods wholly next season." W. J. TROTT, Ringgold, La.

HE'S SATISFIED:

"I used V-C Top Dresser last year on both Cotton and Corn and the same amount of nitrate soda in pounds per acre, and am satisfied. Where V-C Top-Dresser was used I got the greatest yield. I am doing the same this year. I also used V-C Fertilizer under Corn last year. I made three applications and gathered 40 bushels per acre. It is the best guano I ever used on Corn." G. J. MORTON, Director of Bank of Richland, Richland, Ga.

GETS GOOD RESULTS:

"I have been handling V-C Fertilizer for 4 years, and find none better for Cotton and Corn. Also get good results under Vegetables. I have not used it for Fruits. I think it would be fine." P. J. TIDWELL, Buckner, Ark.

WON'T HAVE ANYTHING ELSE:

"I have been using V-C Fertilizers for 7 or 8 years. I find them better than any guano I have ever used. I have used them under Corn and Cotton. I won't have anything else!" R. D. JOHNSON, Snellville, Ga.

These are only a few of the thousands of testimonials received by us

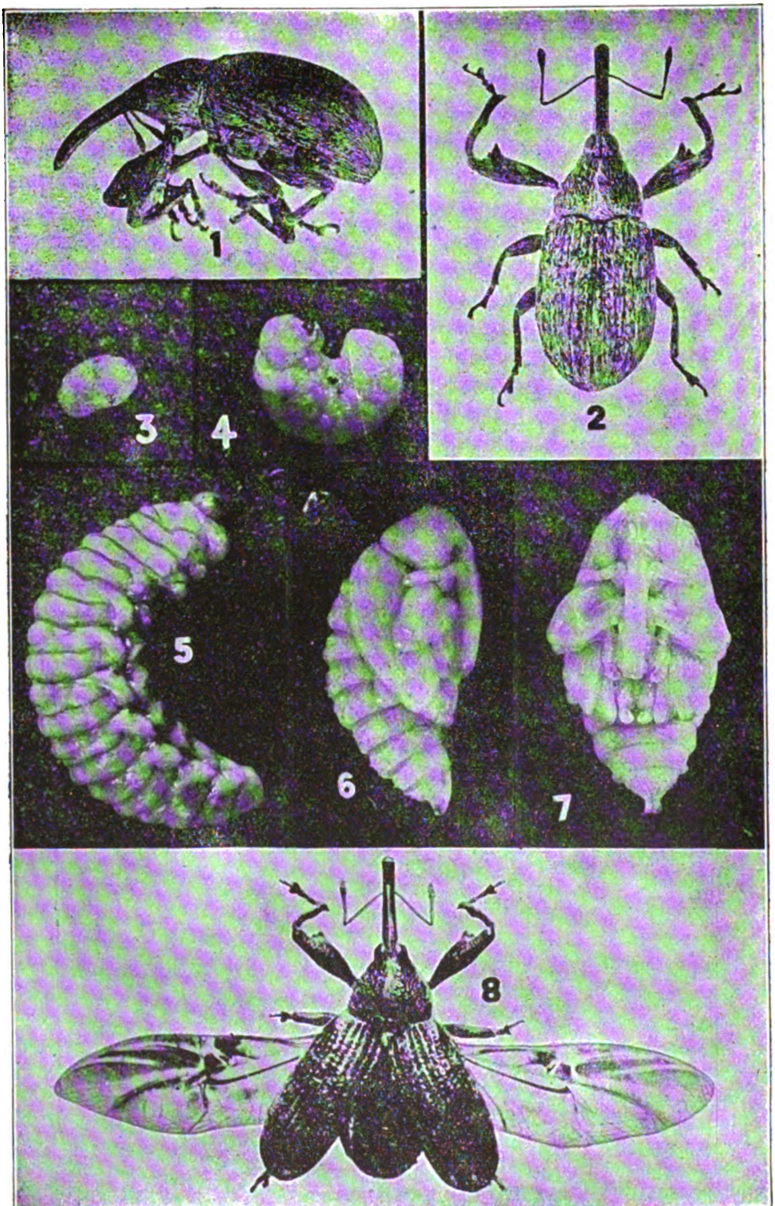

Plate I. "BOLL WEEVIL IN VARIOUS STAGES OF GROWTH".

Fig. I, Adult, side view; fig 2, Adult, dorsal; fig. 3, Egg; fig. 4, Grub, three days old; fig. 5, Grub full grown; fig. 6, Pupa, side view; fig. 7, Pupa, front view; fig. 8, Adult, wings spread. Figs. 1, 2, 5, 7, and 8 enlarged about ten diameters; figs. 3 and 4 enlarged about twenty diameters.

THE BOLL WEEVIL

WHAT IT IS AND HOW TO FIGHT IT

Published by

CROP BOOK DEPARTMENT

VIRGINIA CAROLINA
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CHEMICAL CO.

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PREFACE

It is the well established policy of the Virginia-Carolina Chemical Company to publish the most reliable obtainable information in regard to the profitable production of leading crops. This has appeared in a series of Crop Books which have been widely used by the farmers of the South. The text is prepared by accepted authorities on each particular subject.

In accordance with this policy we present in this booklet on the Boll Weevil a complete review of an insect pest which has exerted so marked an influence upon the agricultural practices of the Scuth that it deserves consideration by itself.

The text of this booklet has been prepared by Dr. W. E. Hinds, who was in charge of laboratory work on the Boll Weevil for the U. S. Bureau of Entomology in Texas from 1902 to 1907 and has since been engaged in the very successful fight against the weevil which has been made by the State of Alabama, where he has been located as State Entomologist. Many of the illustrations shown have been taken by Dr. Hinds in the course of his fifteen years of boll weevil work.

VIRGINIA-CAROLINA CHEMICAL CO.

Mexican Tree cotton grown at Victoria, Texas. Upon wild cottons such as this, the boll weevil developed in Mexico, Central America and Cuba.

THE BOLL WEEVIL

WHAT IT IS
AND
HOW TO FIGHT IT

Introduction

During the past twenty-five years the Mexican cotton boll weevil has been studied more carefully by both the entomologists and cotton raisers than has any other southern insect. It has produced such deep and lasting changes in our agricultural practices as well as in economic conditions and has so vitally affected present prosperity and future prospects for the cotton growing states that it demands careful study not only by every producer of cotton but also by every other person who is at all interested in the welfare and progress of the South.

The fight against the boll weevil can, of course, be made most effectively and economically when based upon an intelligent understanding of the life history, habits, injuries, etc., of the insect and also of the various effects of natural enemies, climatic conditions and cultural practices as they affect the development of weevils and the production of cotton in the infested area.

It is the purpose of this little book to give such an intelligent understanding of this cotton enemy as is needed in order to make cotton culture profitable notwithstanding the boll weevil.

Where Did the Boll Weevil Come From

The Mexican cotton boll weevil is a native of Mexico, Central America and Cuba where cotton grows wild. This weevil has lived so long on cotton that it has lost all power to live and breed upon any other kind of plant growing in the Cotton Belt of the United States.

The cultivation of upland cotton was introduced extensively into northern Mexico about forty years ago and this bridged the gap in the occurrence of cotton between the wild cotton growing farther south in Mexico and the upland cotton fields growing in the Rio Grande Valley along the southern boundary of Texas. Thus the boll weevil was enabled to spread northward reaching the Rio Grande Valley in the fall of 1892. The weevil has never left any section where it has once become established except that near the edge of the infested area it has been set back occasionally for short distances by unusual extremes in climatic conditions. As to further spread, it is reasonable to expect that there may be a considerable area in the western portion of the Cotton Belt that will long remain uninfested on account of its extremely dry climate, but there is no reason to doubt that the weevil will spread quite rapidly northeastward through the Carolinas.

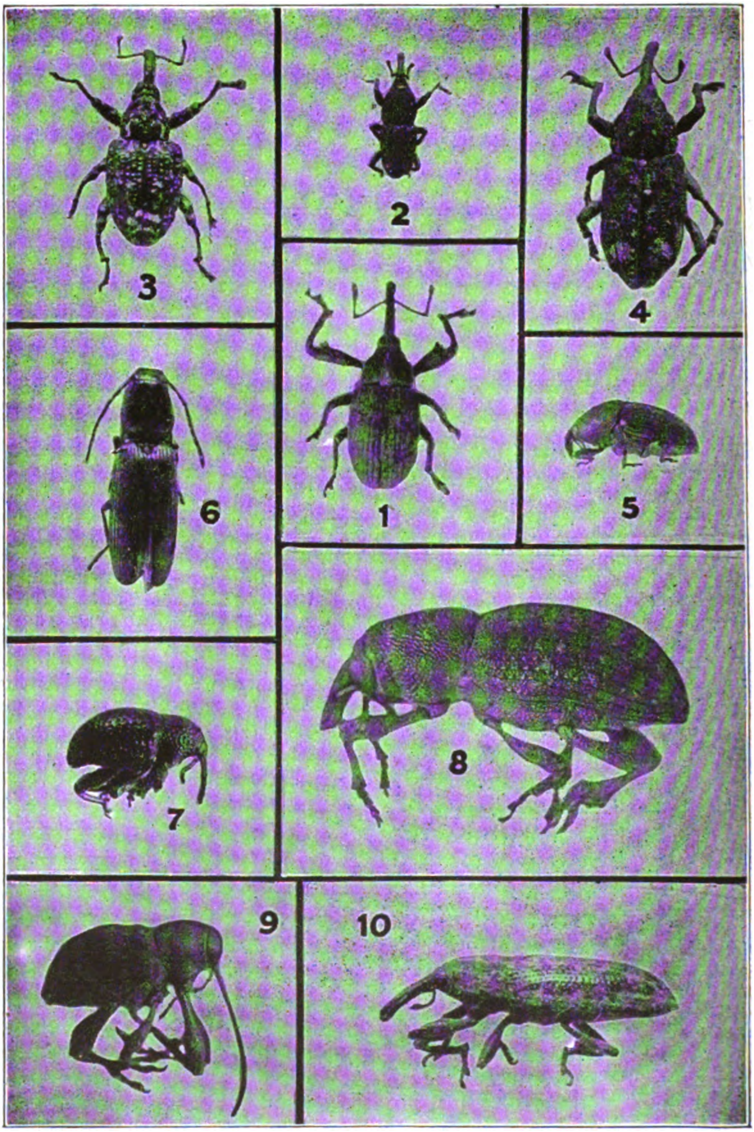


Plate II. INSECTS OFTEN MISTAKEN FOR THE BOLL WEEVIL.

Fig. 1, Boll weevil; fig. 2, Black weevil from corn; fig. 3, Plum curculio; fig. 4, Pine weevil; fig. 5, Cocklebur root weevil; fig. 6, A click beetle from squares; fig. 7, Cowpea pod weevil; fig. 8, Pine weevil, side view; fig. 9, Acorn weevil; fig. 10, Ragweed stem weevil. All enlarged about five diameters.

How the Weevils Spread

The principal spread of the weevils occurs by flight and no human power can prevent this where cotton occurs. This flight movement may be affected to a considerable extent by the direction and intensity of wind currents prevailing during the fall months especially. Weevils do not take flight in a heavy wind but if caught by strong wind currents high above the surface they may be carried for long distances and the greatest advance movements appear to have been due largely to this wind factor.

Water currents may also be a factor when unusual floods spread into infested fields. Infested fallen squares especially may float for many days and adult weevils may also be carried for considerable distances in this way. Commercial movements of seed cotton, cotton seed, cotton seed hulls, etc. may aid in spreading weevils.

How Fast and When the Weevils Spread

During the past twenty-five years the average advance has been about fifty (50) miles annually. Maximum movements occurred during the season of 1915 when they spread through fully 145 miles between Montgomery, Alabama and Atlanta, Georgia, and in 1916 when they advanced about 175 miles through central Georgia to the Savannah River line. This advancing movement begins usually about August 15th and continues until cotton is killed by frost. Weevils then go into winter quarters.

Stages and Work of the Boll Weevil

The Boll Weevil Attacks Cotton Only:

The boll weevil is a beetle belonging to a large group all of which have a part of the head in front of the eyes extended to form a more or less long, slender snout. More than a thousand species of these insects, all of which are commonly called "weevils," occur in the United States East of the Mississippi River, but the Mexican cotton boll weevil is the only one attacking cotton in this country. The boll weevil breeds in both cotton squares and bolls but nowhere else.

Other Weevils Mistaken for Boll Weevils: See Plate II.

The weevils found in the stems and roots of cocklebur or ragweeds, and in cowpeas in storage, etc. are different species but are often mistaken for the boll weevil. These weevils do not attack cotton in any way. Another species of weevil which breeds in cowpea pods and is known therefore as the "cowpea pod weevil" (Fig. 7, Plate II.) is found quite commonly early in spring upon young cotton, where it does some damage by feeding on the buds and tender leaf stems as does the boll weevil.

Four Stages:

1. **Eggs** (Fig. 3, Plate I).—Like all other beetles, the boll weevil has four distinct stages in the development of each individual. The first of these

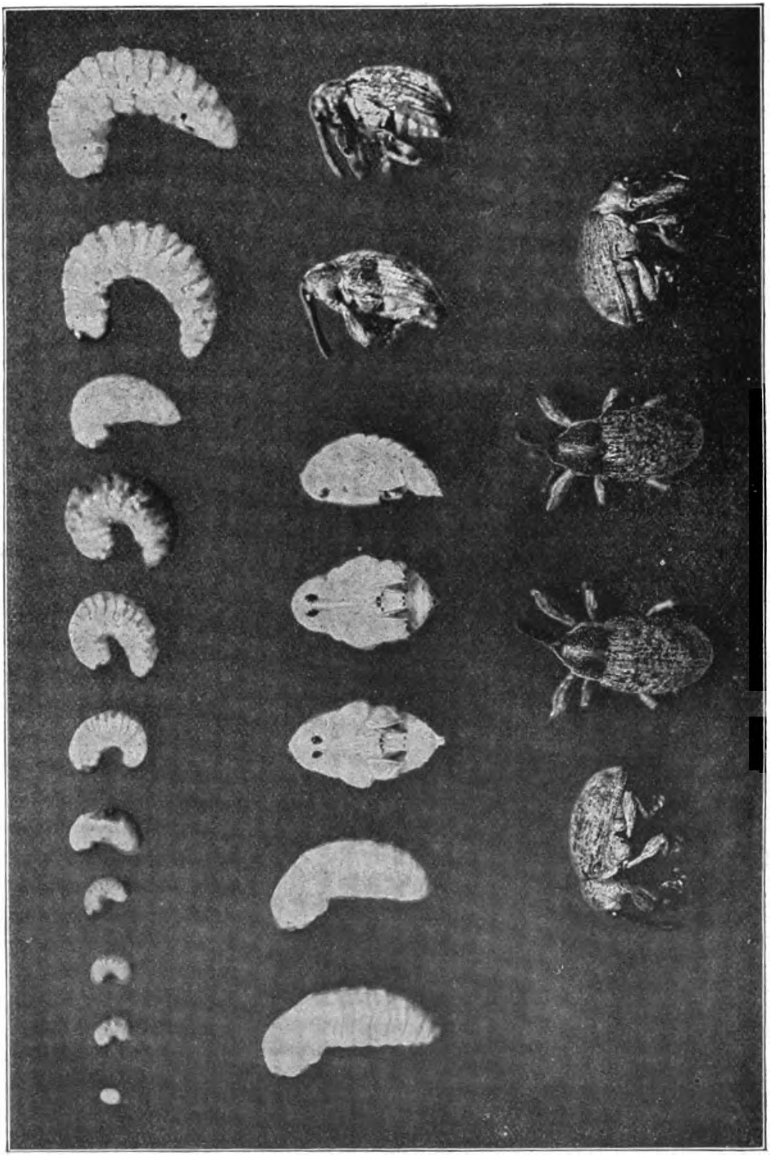


Plate III HOW THE BOLL WEEVIL GROWS.

is the egg, which is only about 1-30 of an inch long, white and very delicate. Eggs are always deposited singly in a cavity which the female eats in a square or boll and no where else upon the cotton plant, and never in any other plant. (See Fig. 3, Plate I).

2, **Grub** (Fig. 4, Plate I).—From the egg there hatches in about three days a white legless grub. It requires about eight or ten days to reach full growth and then resembles in size and appearance the "worms" of the plum curculio found in peaches and plums.

3, **The Pupa** (Figs. 6-7, Plate I.)—In order to attain the beetle form the grub must pass through an intermediate "transformation stage," which is known as the "pupa." In this stage no food is taken, the insect is very delicate, and perfectly helpless. It, as well as the egg and grub stages, is protected within the interior of the square or boll. These three constitute the immature stages in the life of the weevil, but are as characteristic of the species as is the adult form.

4, **Adult** (Figs.1,2.8, Plate I).—After about three days the pupa sheds its skin and becomes the fully formed adult weevil, having the legs and snout free and usuable, as are also the wings. For two or three days the adult also remains protected within the square or boll while it becomes hardened and more able to care for itself. It then cuts a circular hole just the size of its body in the wall of its cell in the square; and through this opening, which is called the emergence hole, makes it escape into the outer world, where from that time on it leads a free and active life. Weevils escape from small bolls as they do from squares but in large bolls they wait for the boll to mature and crack open before they transform and then have only to cut their way through the wall of the cell in which they have transformed.

The adult beetle is about ¼ inch long, including the slightly curved snout, which is half as long as the rest of the weevil's body. The color is dark brown, ashy-gray, or yellowish brown. The full-grown weevils fly and their spread into new territory is accomplished almost entirely in this way.

Developmental Period: (See Plate III.)

The rate of development is affected by temperature principally as is the growth of cotton. The average period from the laying of an egg in a square to the emergence of the full grown weevil is eighteen days and may be as short as twelve days. In large bolls the developmental period may extend over eleven weeks. As a rule infested squares fall to the ground in eight or ten days after the egg is deposited.

Signs of Injury: (See Plates IV., V.)

Among the most conspicuous external signs of boll weevil presence and injury are the following: The occurrence of open cavities 1-25 to 1-30 inch in diameter and reaching down to larger excavations among the pollen sacs; the presence of "warts" marking the egg punctures of the weevil; the occurrence of the orange-colored excrement of the beetles on the buds; the abundant shedding of squares and the consequent scarcity of blooms without accompanying temperature, rainfall or cultural conditions to cause the shedding and the occurrence of dead, blackened leaflets in the terminal buds of the young plants in spring.

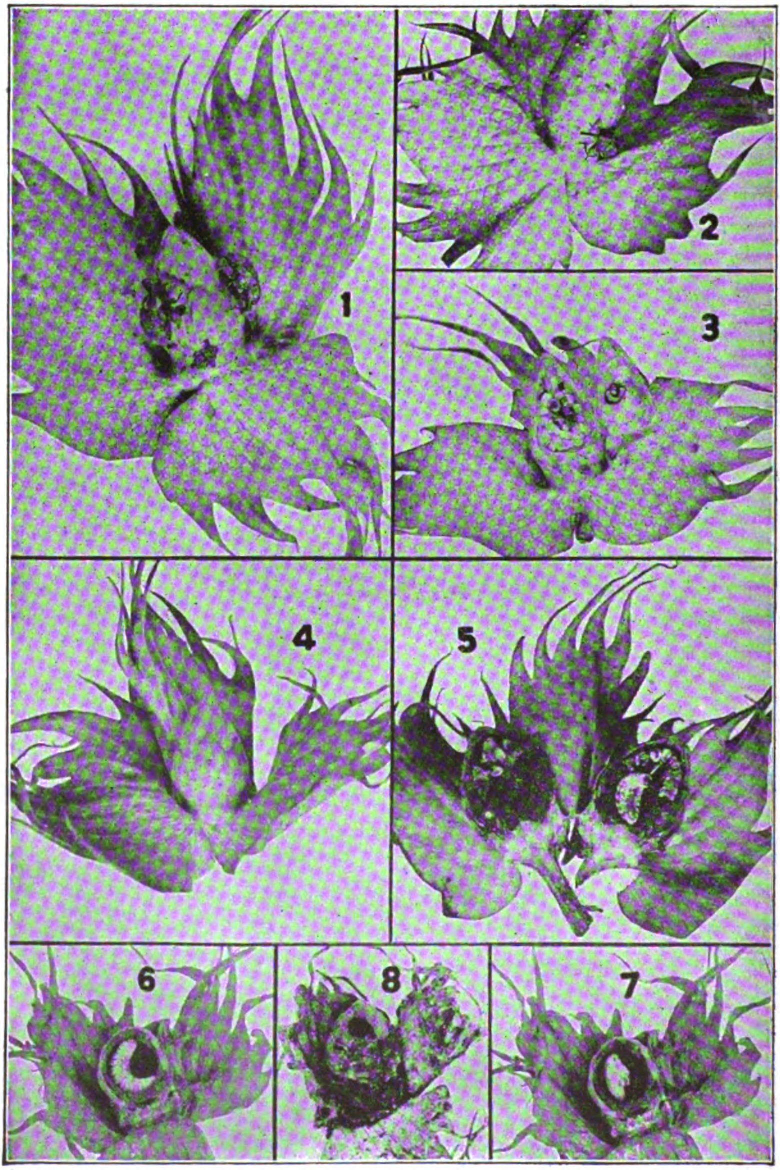


Plate IV. WEEVIL WORK ON SQUARES.

Fig. 1, Feeding positions of adults, typical; fig. 2, Orange colored masses of excrement: work of young weevil; fig. 3, Interior of feeding puncture; fig. 4, Egg puncture, sealed; fig. 5, Grub half-grown at falling of square; fig. 6, Full-grown grub; fig. 7, Pupa transforming; fig. 8, Emergence hole. All natural size.

Generations:

There are about five full generations on the average through the cotton belt. The third generation usually matures early in August and by the middle of August weevils become so numerous that all squares are infested as fast as they appear, hence no more bolls can be set.

Migration:

When this condition of complete infestation is reached some of the weevils begin to move in search of uninfested fields. This spread occurs in all directions but can be measured only as it occurs into hitherto uninfested regions. The migration continues until frost kills the cotton. Then the adult weevils seek shelter for the winter. By frost time the weevils may number from 5,000 to 50,000 to the acre where stalks are permitted to stand so that they have unlimited opportunity to multiply in the late top growth.

Hibernation:

This term refers to the state or condition in which the weevils pass the winter season. No food is required but the kind of shelter from rains and cold found by the weevils is a very important factor in their survival. Comparatively few weevils enter hibernation quarters before frost but after cotton is killed they seek shelter in or near the field where they were feeding. Any kind of trash is utilized but the old hulls hanging on standing stalks, and grass and leaves in such fields, are exceptionally favorable. Stumps, fence rows and timber fringes are very important places also. The long gray Spanish moss is extremely favorable to their survival and weevils hibernating in it are likely to emerge from it unusually late. (See illustrations on pages 18 and 20). The presence of this moss indicates mild winters and a very moist summer atmosphere which are so favorable to the weevils that profitable cotton culture is very uncertain near where Spanish moss is abundant. The survival of weevils where hibernation conditions are extremely favorable has been known to exceed 40 per cent. but as a rule the average emergence in spring is about 3 per cent. of the weevils entering hibernation.

Emergence and Spring Activity:

Weevils leave their winter shelter gradually. While some are certain to be active before the first planted cotton is up the last will not be seeking food before the first of July. In Alabama in 1917 many weevils emerged after July first. This very long emergence period makes the spring campaign against the weevil a difficult matter. It explains why it is impossible to starve out all of the hibernated weevils by planting all cotton very late. Weevils can live for months on foliage and the first food of the early emerged weevils is found in the tender tips of the young plants. They bore into the little leaf stems causing leaves to die and turn black in the top of the plant. As soon as squares occur the weevils gradually make their way to them and thereafter they attack squares and bolls exclusively. Many weevils do not emerge from hibernation until after squares are abundant and therefore find squares immediately. Females must feed on squares for a few days

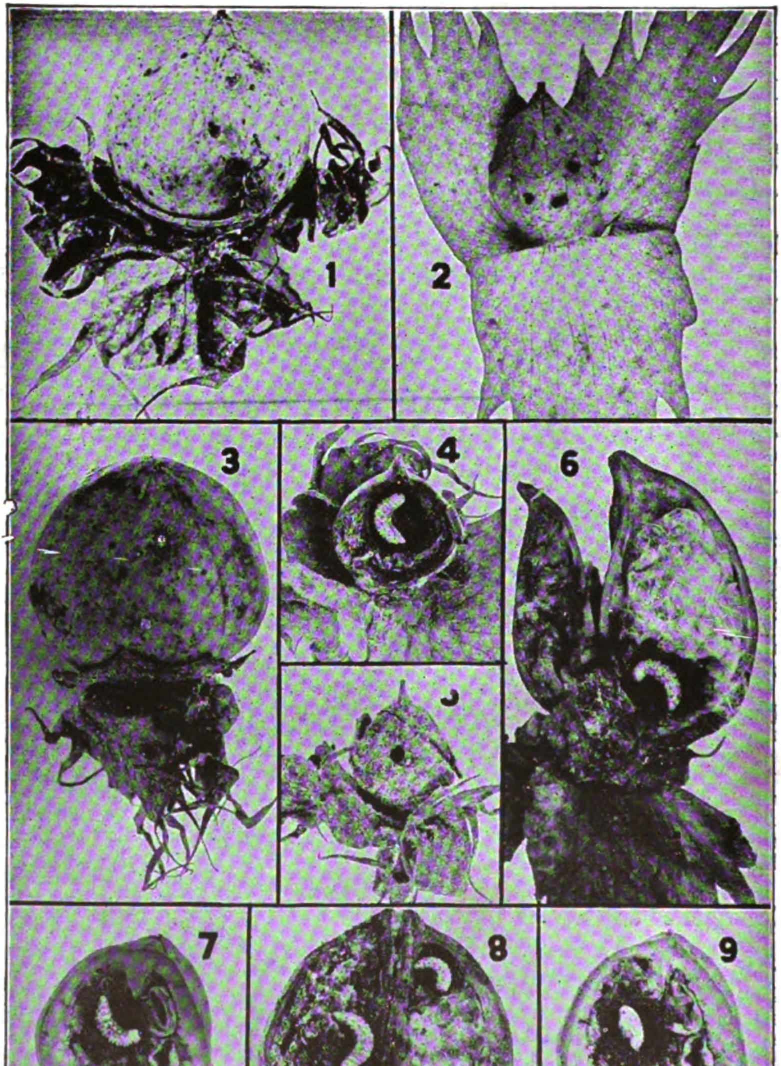


Plate V. WEEVIL WORK ON BOLLS.

Fig. 1. Feeding on boll three-fourths grown; fig. 2, Feeding punctures in small boll; fig. 3, two egg punctures in one lock of large boll; fig. 4, Full-grown grub, in small boll; fig. 5, Emergence hole in small boll; fig. 6, Grub full-grown, large boll; fig. 7, Grub destroying two locks; fig. 8, Many weevils may develop in a boll; fig. 9, Pupation in a boll. All natural size.

before it is possible for them to lay eggs. Breeding cannot begin before squares appear. The first eggs are laid at about the time the first bloom appears. Some hibernated weevils will be active and laying eggs until well into August.

Fighting the Boll Weevil

Infestation Permanent:

The Mexican cotton boll weevil must be reckoned with in the production of all future cotton crops within the infested area. It is not a passing pest as many may expect it to be. It will continue as long as cotton continues to be grown. The boll weevil has never "left" any section in the United States where it has once become established. Its injuriousness usually reaches about a maximum during the third or fourth year of its occurrence and thereafter varies principally through the favorable or unfavorable influence of climatic conditions and through the changes in methods of producing cotton which enable the farmer to produce his living (food crops for the consumption of his own family) at home and oftentimes nearly as much cotton as had been grown formerly with nothing but cotton.

Zones of Injury:

It is true that weevil injury varies in different sections but it is quite fairly constant under the same set of environmental and cultural conditions. Study your own situation and compare it with other similar sections where the weevil has been for three or more years if you would get a fair idea of the injury the weevil is likely to do in your section.

Summer Rainfall Most Important Factor:

It has been found that boll weevil injury varies quite directly with the amount of rainfall during the three months of June, July and August, as this is the period when cotton is putting on most of the crop. This is the period covered in all cases where rainfall is referred to in the following paragraphs. With a rainfall of more than 18 inches in this period cotton is usually a failure, although the effect may vary much according to the way the rainfall is distributed. With less than 8 inches in these three months, as is the case in western Texas, the weevil is likely to be a negligible factor and may not be able to survive through the season. The average rainfall through the Cotton Belt for these three months is 14 inches.

Territory Having More than 16 Inches Summer Rainfall Will Lose Half or More of Cotton Crop:

Along this 14-inch line in older infested territory the average decrease in cotton yield, including weevil injury and reduction in acreage, has been fifty per cent. Between the 14-inch line and the Gulf and South Atlantic Coasts where the rainfall is from 18 to 20 inches, cotton is bound to be a very uncertain crop, making a fair yield in very dry seasons and liable to be a failure in wet seasons. In this area the largest degree of change must be made in the whole farming and economic system on account of the weevil. Here we must have the largest reduction in cotton acreage and a proportionate increase in other crops, pastures and livestock.

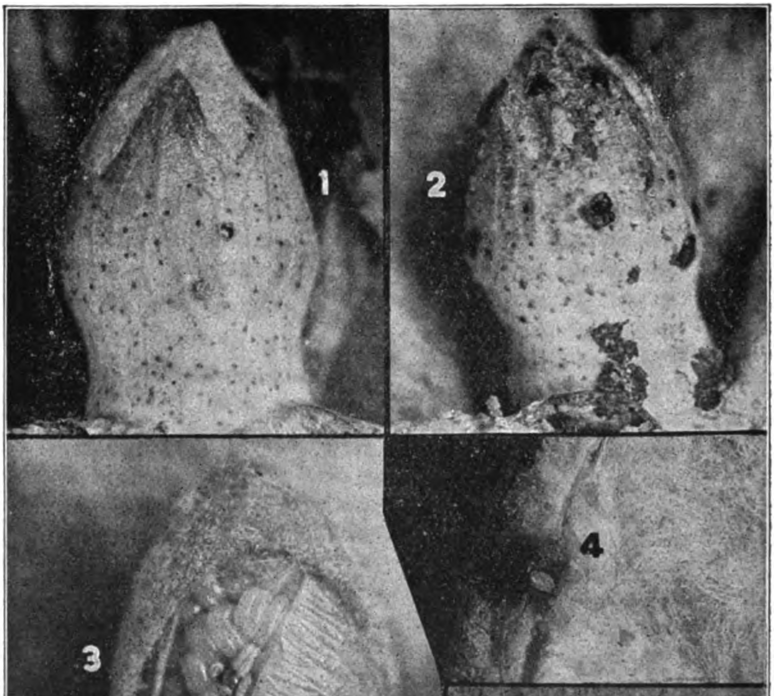


Plate VI. BOLL WEEVIL WORK ENLARGED.

Fig. 1, Normal egg and feeding punctures; fig. 2, Feeding of young weevil; fig. 3, Egg in position among anthers; fig. 4, Egg in position in boll hull; fig. 5, Eggs and newly hatched grub; fig. 6, Adult crushed by proliferation. All enlarged about five diameters.

Reducing Cotton Acreage to Safe Basis:

No man should attempt to raise more acres of cotton per plow than he is reasonably certain of being able to give all of the extra care that will be demanded under weevil conditions, even if there should be a little more than the average rainfall that is due in his section. Therefore, in counties with 16 to 18 inches of summer rain, it is not wise or safe for the average man to try to raise more than 5 acres of cotton per plow. Between the 16-inch and 14-inch lines we would advise not more than 6 or 7 acres per plow where the weevil has been present for more than one year. In the 14-inch zone 7 to 8 acres is fairly safe; and this area may be increased gradually for sections where the summer rainfall is still less. It is far better to reduce cotton for a time below the acreage that can be handled successfully and then increase it gradually after the best methods of weevil fighting and control have become well known. Only where a man has cleaned up his cotton stalks early the preceeding fall or has available an unusually large number of children to help with the summer weevil fight should the foregoing estimates as to safe acreage be materially increased.

Hold to Safe and Proper Acreage:

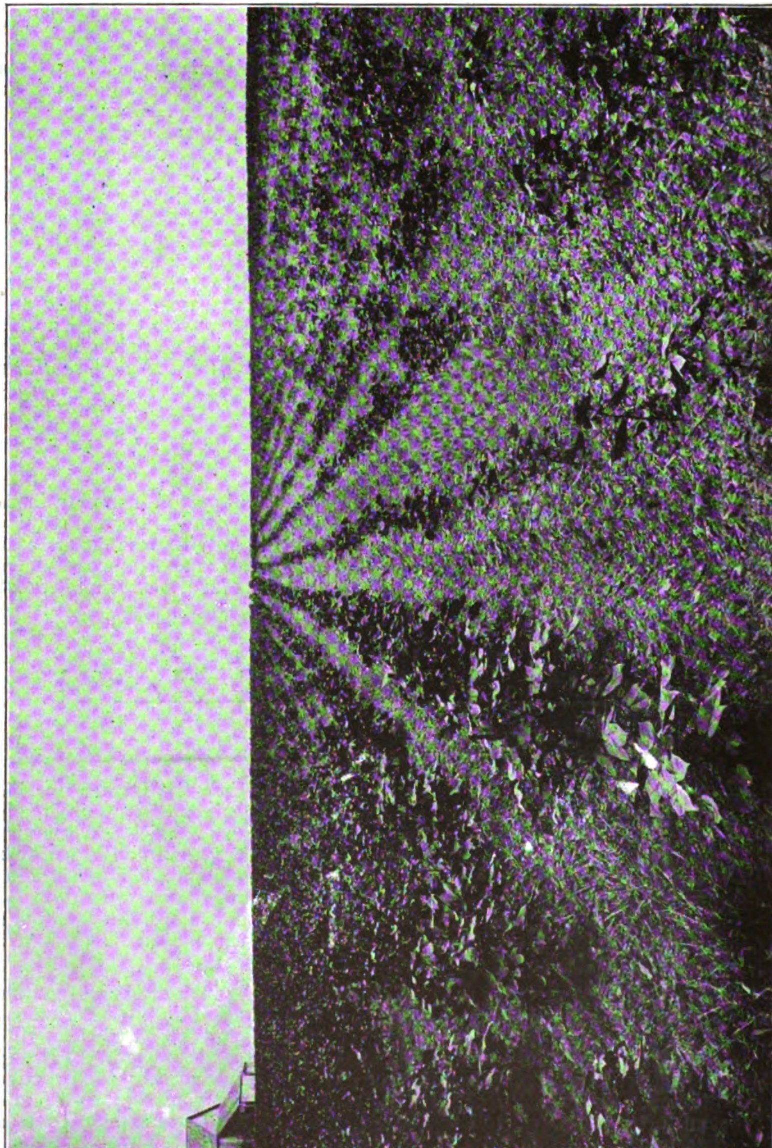
Do not be misled by fluctuations in the price of cotton into planting a much larger acreage than has been indicated above with the hope of reaping great profit from high prices. The result is quite likely to prove disastrous rather than fortunate. Follow reasonably safe acreage and improve yields through better farming and weevil control methods for greatest and surest profit with cotton in the long run.

Cultural Methods Effective in Weevil Control

Diversification and Rotation Effective:

The weevil can live on cotton alone but neither the farmer nor his livestock can do this. We can and must raise a variety of crops. This is diversification. Plant especially such crops as can provide food supplies for man and beast on the farm. Stop having to buy, and pay big profits to others for the food that you can as well raise at home. Diversification makes it more possible also to practice rotation and to use cover crops to build up the soil and make it more productive without depending solely on commercial fertilizers while at the same time the fertilizers used will return larger profit than they will on poorer soils.

The vegetable matter in the soil (humus) can be increased and fertility can be improved by using such crops as clovers (especially bur or crimson) cowpeas, beans, velvet beans, vetchs, etc. The growth of weeds may be prevented and the injury due to both fungus diseases like the boll rot and insect pests such as the boll weevil may be largely reduced by the practice of rotation. As a matter of fact, the profit derived from the use of commercial fertilizers is quite largely in proportion to the amount of humus present in the soil.



Fertilization pays with boll weevil, because everything possible should be done to push the plants to heavy, early fruitage. Continue shallow, frequent cultivation also as long as possible without damaging plants in getting through the rows. Note marked effect of fertilizer shown on left.

Prepare Soil More Deeply and Thoroughly Before Planting:

The results of innumerable experiments and the practical experience of all of the most successful planters prove that deeper plowing with more thorough working of the soil before planting is one of the first principles in any more successful system of agriculture. Deep plowing should generally come in the fall but thorough spring preparation is also essential to best results with most crops.

Cotton Crop Must Be Made Rapidly:

No principle has been more clearly established than this. Successful cotton crops in weevil-infested territory must be made rapidly. The multiplication of the weevil is so rapid that after the third generation becomes adult, usually about the first to the fifteenth of August, there is little chance for more bolls to be set. The presence of the weevils absolutely prevents any "top crop" and usually makes the raising of "late cotton" practically an impossibility.

Early Planting Alone is Not Enough:

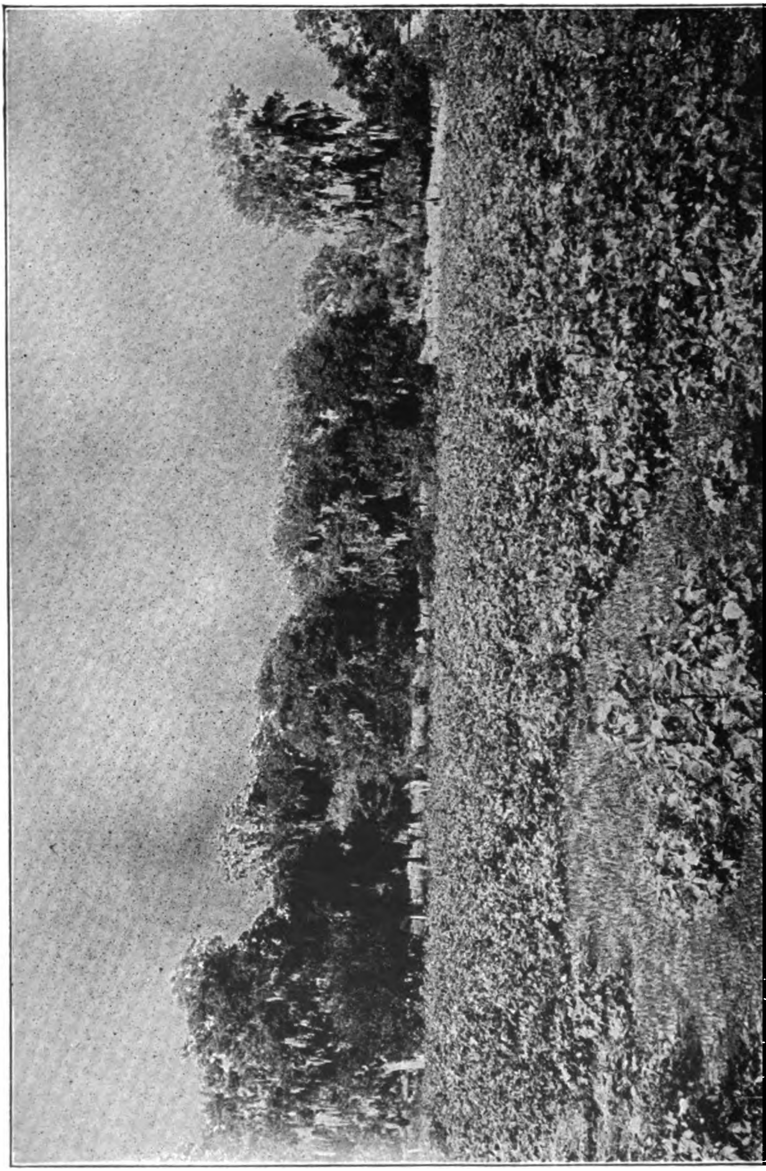
More things are involved in making a good crop of cotton early than merely early planting of the seed. That alone is not enough to secure success. It is not so much a question of any date on the calendar or of "planting extra early" as it is of reducing as much as possible the time between the first formation of squares and the development of an abundance of bolls to a size at which they are practically resistant to weevil attack. With most varieties of cotton weevils cannot puncture and successfully deposit eggs in bolls that are more than two-thirds grown. The thicker the hull the earlier in its growth does it become immune to attack.

Varieties of Cotton For Weevil Conditions:

First of all we may emphasize the fact that there is no "one best variety" of cotton for all conditions. There are many good varieties and from this list the cotton planter should select such as best suit his conditions. The real basis finally is that of actual experience, of the demonstrated ability of a variety to produce the best yields under the best agricultural conditions that the farmer is able to maintain.

Plant as Early as Soil and Air Conditions are Favorable:

It is a well known fact that moderately early planted cotton commonly yields better than that planted late. Extremely early planting is hardly desirable or advisable. The object is to have the plant grow off rapidly and steadily so that the fruiting may be abundant and the period from squaring to the real making of the crop may be as brief as possible. **Plant then as early as soil and air conditions become favorable for the rapid and continuous growth of the cotton.** The date for this will vary in different seasons and in different sections of the South. As a general rule, plant all cotton as soon as soil conditions will permit following rains occuring about a week or ten days after the average date for last-killing frost in any locality. This frost date may be obtained from any Weather Bureau official or from the nearest local observer.



Grass in the rows; Spanish moss abundant. Ideal hibernation quarters and weevils so abundant that they punctured squares as fast as they formed in the spring so that very few blooms appeared here, and no crop was set. This was a case of extreme damage.

Uniform Date for Planting Desirable:

It is an advantage to have all cotton in a locality reach the squaring condition at approximately the same date. Weevils cannot begin to reproduce until squares form. If one field in a locality forms squares a month earlier than does another nearby field it will produce a generation of weevils which may spread to the later field and injure it very seriously before it can set its crop. Thus while the earlier field may produce a fair yield, the later field may produce nothing, unless the earlier maturing field is handled most carefully as a trap plot and weevils and infested squares properly collected therefrom. A difference of three weeks in date of planting in adjoining fields has been seen occasionally to make all the difference between a yield of two-thirds of a bale per acre and an absolute failure. Where all fields in the locality develop together the weevil finds no such advantage for its multiplication and must therefore do less injury.

Extremely late planting, with the idea of starving out the overwintered weevils is therefore doomed to failure and should never be attempted. This has been tested many times and has always resulted in loss.

Cultivate Often and About One and One-half Inches Deep:

The surface of the ground should be stirred at least once a week during the growing season to a depth of about 1½ inches. Where the weevil is found the crop should not be "laid by" as early as has usually been done but cultivation continued two or three weeks longer, if possible to get through the rows without much breaking of plants. This may well be continued until cotton begins to open.

Never neglect cultivation for either the collection of weevils or infested squares. If the labor supply is not sufficient to adequately care for both, it is generally better to keep up the cultivation as often as needed and allow the collection of weevils to go undone. Push the growth of the plant.

Collect Weevils When Squaring Begins:

Beside the cultural practices which have been mentioned there are two special steps that are necessary where weevils are abundant and especially where the summer rainfall amounts to more than 4 inches per month. The first of these steps is the collection of the hibernated weevils from the young plants at the time that squares begin to form. In some cases more than 2,000 hibernated weevils per acre have been thus collected and destroyed. If the weevils are picked by hand they may be crushed as they are captured, or dropped into a bottle containing a little kerosene. In this work it is advisable to use the hoop and sack outfit described below. The conspicuous sign of the presence of weevils at this stage of the cotton is the appearance of small, black, dead leaves in the tender terminal bud of the plant. The object of this first collection of weevils is to destroy as many as possible of the over-wintered weevils before they have laid any eggs.

Destroy Infested Squares:

This second step in weevil control is also necessary especially where the rainfall is heavy so that the surface soil is moist most of the time or when the air temperature in the shade does not go much above 90 degrees F., as lower temperatures are not likely to kill many of the weevil stages

Weeds along the fences. Trees covered with Spanish moss. Ideal hibernation quarters for the weevils and as a consequence very heavy damage occurred in this field year after year.

even if the ground is dry. Under these cool, moist conditions nearly all eggs will produce adult weevils if left undisturbed. Picking of infested squares should be done thoroughly, taking the evidently injured squares from the plants as well as the fallen squares from the ground. It should be begun in ten or twelve days after the appearance of the first bloom in the field, and repeated every fifth day until four to six collections are made. It is well to combine the collection of weevils and infested squares so long as any considerable number of weevils is secured.

Hoop and Sack Method:

In the collection of weevils, and also of infested squares, the use of the hoop and sack method has been found helpful by some planters. The mouth of the sack is held open by a hoop. With one hand the hoop is held closely against the base of each plant, while with the other hand the plant is bent carefully into the open mouth of the sack and given a short, snappy shake sidewise, taking care not to injure the tender plant. By this method many infested squares, almost ready to fall, will be shaken into the sack along with the adult weevils.

Machines for Collecting Weevils:

A great many machines have been invented to do this work. There are many important practical difficulties in the way of the successful use of such machines. Planters will do well to get a disinterested opinion from the entomologist regarding the merits of any boll weevil machine before investing in one.

Cost of Summer Control:

While it will not often pay to employ wage hands to collect weevils or to pick up fallen infested squares at even 75 cents per day, it will pay to collect them if the children in the family can do the work. Most cotton squares fall to the ground in about ten days after the weevil eggs are placed in them, and when the grub is about half grown. In from five to ten days more they may produce adult weevils. If it is very hot and dry and the surface soil forms a dust mulch, fallen squares exposed to the direct sunshine would be "baked" so that all weevil stages in them would be killed. It would not then pay to pick up these squares. Under such conditions as will destroy most of the developing weevils naturally, it is better to put every effort into frequent cultivation if the work of square collection reduces cultivation at all. Keep track of the conditions existing by cutting into a considerable number of fallen forms at frequent intervals and be governed accordingly regarding the collection of squares. If done at all, it pays to get the first fallen squares, to pick also all evidently infested squares from the plants and to do the work thoroughly. Naturally these summer methods are much more expensive than the relatively simple matter of early fall destruction of the cotton stalks. The expense of collecting weevils and squares, even with the hoop and sack outfit, ranges usually from $2 to $3 per acre where labor has to be paid for.

Fine conditions for boll weevil hibernation and poor for cotton cultivation, where stumps and deadened timber are allowed to remain in the fields. It pays to remove stumps.

Some Rules for Poisoning the Cotton Boll Weevil.

(Extracts from U. S. Department of Agriculture Circular 162.)

Many valuable lessons have been gained from the recent expansion of commercial weevil poisoning by calcium arsenate. It has again been shown that the boll weevil can be poisoned with profit if conditions are favorable and if proper methods are used, but it has been emphasized anew that unfavorable conditions and improper methods can lead only to failure. A survey of the poisoning by farmers in 1920 shows that an unfortunately large proportion were not properly informed as to the conditions under which they should poison and the methods they should pursue. As a result there were many unnecessary failures. If better results are to be secured in the future, therefore, the operation must be more thoroughly understood. The present circular is prepared to give, in as brief and concise a form as possible, the information needed by a farmer in deciding, first, whether it will pay him to poison and, second, the methods he should follow.

Weevil poisoning is fully as important an operation as cultivation and deserves as much serious thought and attention. Unless you are willing to undertake it in this manner, you should not attempt to poison. Study these instructions carefully and follow them as closely as your conditions will permit.

Where Will it Pay You to Poison?

It will pay to poison—

If the weevils are really injuring your crop seriously, and

If your land is sufficiently fertile to yield at least one-half bale per acre with weevil injury eliminated, and

If your farming organization is such that you feel assured that the poison applications will be made at the right time and in the right manner, and

If you are willing to spend the full amount necessary to provide an adequate supply of dusting machinery and poison.

The general gains from weevil poisoning under average, fairly favorable conditions seem to be from 200 to 400 pounds of seed cotton per acre, but owing to variations in degree of weevil injury it is not safe to expect much more than the lower figure.

Consequently, you should not poison if the cost of the calcium arsenate, the cost of the labor to apply it, and the depreciation on the dusting machines will total more per acre than the current value of 100 pounds of seed cotton.

Hand guns should be figured as depreciating 100 per cent in a season and the larger machines about 25 per cent.

What Dusting Machine Should You Use?

Make your acreage allotment according to the following schedule, and buy a surplus rather than shortage of machines, as this will save you money.

Hand Guns.

Do not allot over 8 acres to one hand gun.

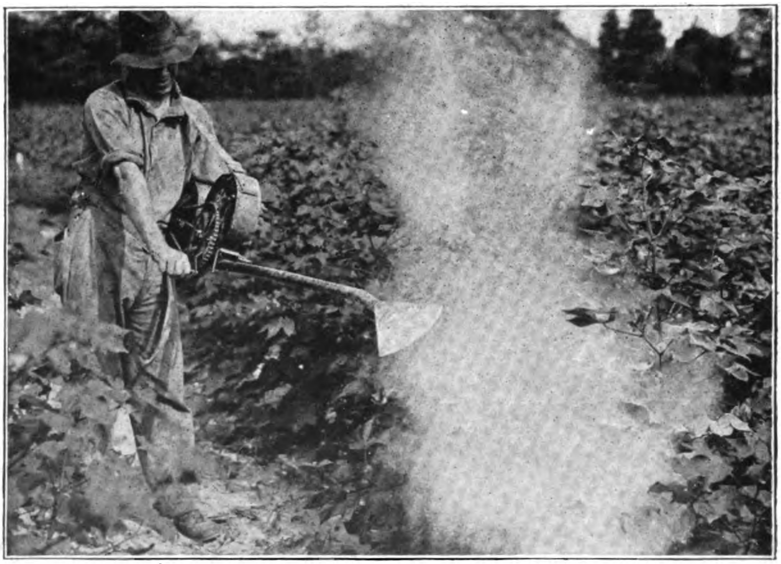
Do not attempt over 25 acres in one organization with hand guns.

Do not supply individual tenants with hand guns and expect each to care for his crop successfully independent of the others.

Use hand guns only when no other machine is suitable.

One-Mule Machine.

This term is used to describe the new type of one-wheel, one-mule machine which is just being placed on the market. It sells at a medium price and is suitable for small farmers.



Cotton dusting with arsenical poisons for boll weevil control.

This machine will cover from 15 to 20 acres in a night of operation. It should not be allotted more than 60 acres for the season.

This machine has only two nozzles but will usually cover three rows at a trip.

Cart Machine.

This term is used to describe the two-wheel, two-mule machine which straddles a row of cotton. It is the type most suitable for large farmers.

This machine will cover from 25 to 30 acres in a night of operation.

One of these machines should be allotted not more than 100 acres of infested cotton for the season.

This machine has three nozzles, but will usually cover four rows at a trip.

Use only pure calcium arsenate in the form of a dry powder.

Apply this only in the dust form.
Purchase this to conform to the following specifications:

Not less than 40 per cent total arsenic pentoxid.
Not more than 0.75 per cent water-soluble arsenic pentoxid.
Density not less than 80 or more than 100 cubic inches per pound.

Use only dusting machinery especially constructed for cotton dusting.

Poison only when the air is calm and the plants are moist. This practically means making only night applications.

Use about 5 to 7 pounds of calcium arsenate per acre for each application.

Start poisoning when the weevils have punctured from 10 to 15 per cent of the squares.

Keep your cotton thoroughly dusted until the weevils are under control. This usually means about three applications at the rate of one every four days.

Then stop poisoning until the weevils again become abundant.

If the weevils become abundant early enough to injure your young bolls, make one or two more applications late in the season.

If you have a heavy rain within 24 hours after dusting, repeat this application immediately.

Do not expect to eradicate the weevils. Poisoning merely controls them sufficiently to permit a full crop of cotton and you can always find weevils in the successfully poisoned field.

Keep your cotton acreage low and do everything possible to increase your yield per acre, as it costs just as much to poison one-quarter bale per acre cotton as bale per acre cotton.

Always leave an occasional portion of a cut unpoisoned for comparison with the adjoining poisoned tract. This will show how much you have increased your yield by poisoning.

Pick Cotton Promptly:

This is to clear the way for the early destruction of all green cotton. We cannot even afford to wait for the last few bolls or "scrappings," as this waiting delays the work of destroying stalks and the resultant increased injury to the next crop of cotton from the larger number of weevils that will survive is likely to amount to many times the value of the "scrappings" saved in the fall. The reduction of acreage in cotton, and the earlier maturing crops produced under weevil infestation, make the early picking out of cotton entirely practicable where it had not been thought possible before the advent of the weevil.

Select Seed For Weevil Resistance:

Get good seed to start with, then select carefully for next year's planting, taking the best and earliest bolls from plants of the most desirable type. Remember that this "type" under boll weevil conditions must produce the maximum possible crop of bolls in the shortest possible time after squaring begins, with a foliage that will not shade the ground too heavily. Such plants will usually be of medium size with numerous fruiting branches and few, if any, vegetative branches, bolls will be set closely together on

A good type of plant for weevil conditions.

the branch and will be "bunched" in closely around the basal and inner two-thirds of the mature plant. These bolls may have thick hulls but in any case should become immune to weevil attack within the shortest possible time after they are set. Hairy stems are also desirable as this character hinders the weevils decidedly in their movements over the plant and therefore delays their working. (See illustrations, pages 32 and 34).

Weevil Control by Early Fall Destruction of Cotton

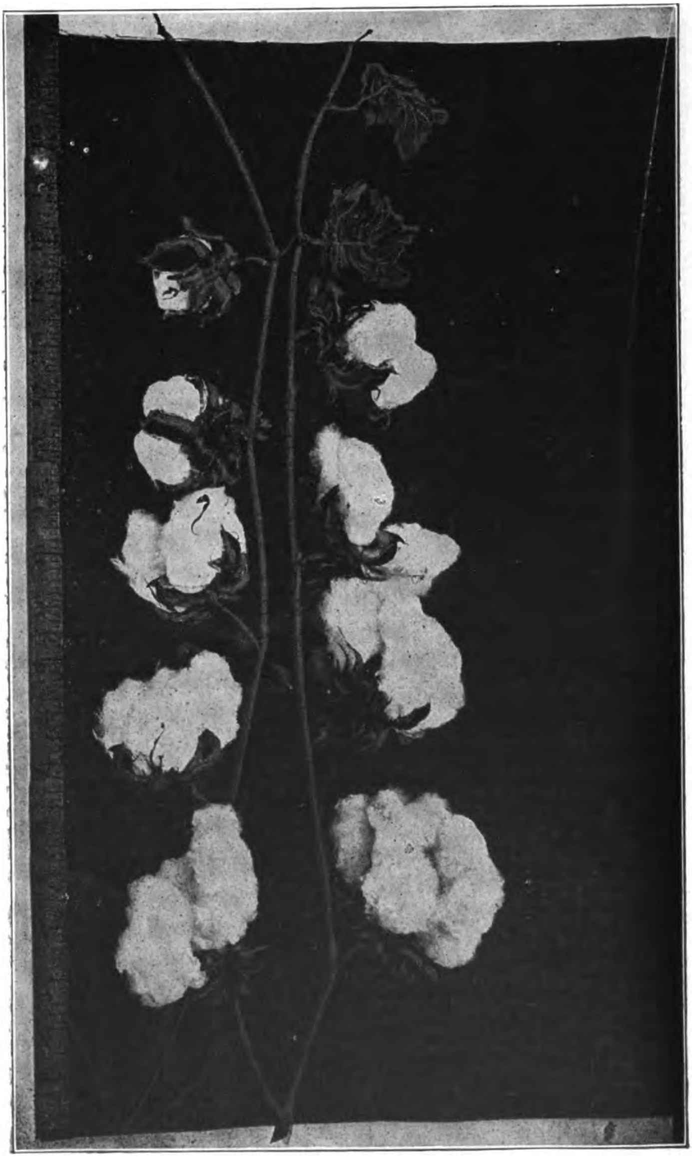
Early Stalk Destruction is Usually Possible:

Having selected seed for next year's planting, and harvested the main crop, then the next step in point of time is to starve the adult weevils, which can only feed on cotton, and prevent the development of thousands of weevils in the late fall growth of squares and bolls, which never can do anything but breed weevils. Do this to save next year's crop. No late maturing cotton occurs where the weevils are abundant. With the reduced acreage in cotton, it then happens that the picking season ends, cotton fields can be cleaned up and winter growing cover crops may be planted many weeks earlier than such things can usually be done before the weevils arrive. Early stalk destruction is most practicable, as it is most necessary, in the sections near the coast where the growing season is longest, where the necessary reduction in cotton acreage is greatest and where weevil damage is normally heaviest. The longer the period between the removal of green cotton plants and the occurrence of killing frost the more complete will be the destruction of the weevils and consequently the less will be the weevil injury to the following crop of cotton. To be most effective, stalk destruction should occur a month before frost and must include the destruction of squares, bolls and foliage with no chance of sprouts appearing later to maintain the surviving adults until frosts occur.

Why Stalk Destruction is so Effective:

There are three principal reasons why early stalk destruction is more effective than is any other practice in directly controlling the boll weevil: First, it completely prevents the late fall breeding. These late-developed weevils are the ones most likely to survive the winter as they have not exhausted their vitality by long flights or by extensive deposition of eggs as have the older weevils. Second, few full-grown weevils can live for more than three weeks without food before killing frosts occur. After frosts the weevils live on the average for more than seven months without tasting food. Early destruction of stalks therefore forces the weevils to move for food to other fields where stalks are still standing or leaves them to starve before it becomes cold enough for them to live without food. Third, cleaning up the cotton fields early in the fall removes the very best winter shelter condition that the weevils could possibly find and therefore reduces directly the percentage of weevils surviving the winter.

The combination of these factors makes the early fall destruction of green cotton the most effective method yet found for fighting the weevil successfully. It is also the most economical method for controlling the weevils as it need not involve any real extra expense.



Short-jointed desirable type for boll weevil conditions.

Records from Texas and Louisiana:

More than 175,000 definite observations made in Texas and Louisiana during several seasons and in a number of widely separated localities gave the results shown below for each 1,000 weevils present when their food supply was removed.

All Cotton Stalks Destroyed by	Number of Weevils Per 1,000 Surviving Winter
September 30	2
October 15	21
October 31	68
November 16	121

What we found to be true in so large a number of observations, in many localities and in an average of several seasons West of the Mississippi River is doubtless approximately true also in infested territory East of the Mississippi, and we may therefore expect a similar survival under average winter conditions here.

Three Methods of Destroying Stalks

There are only three methods of stalk destruction to be considered. They will be mentioned in the order in which they have been commonly practiced, which is, however, the inverse order of their real value.

1. Grazing: Not Recommended:

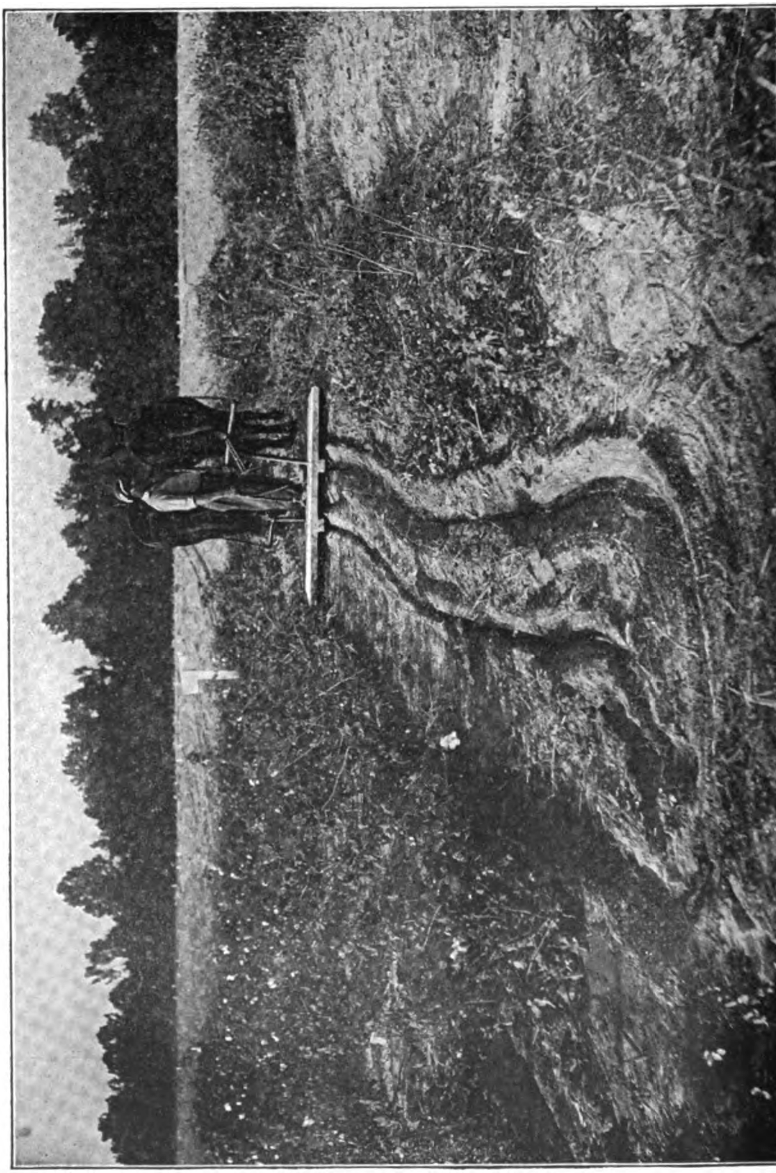
The only condition under which grazing can have much value is in the very exceptional cases where the farmer can turn in sufficient stock to graze off all green cotton within a few days time. The grazing method is therefore unreliable, unsatisfactory and cannot be recommended.

2. Burning of Stalks:

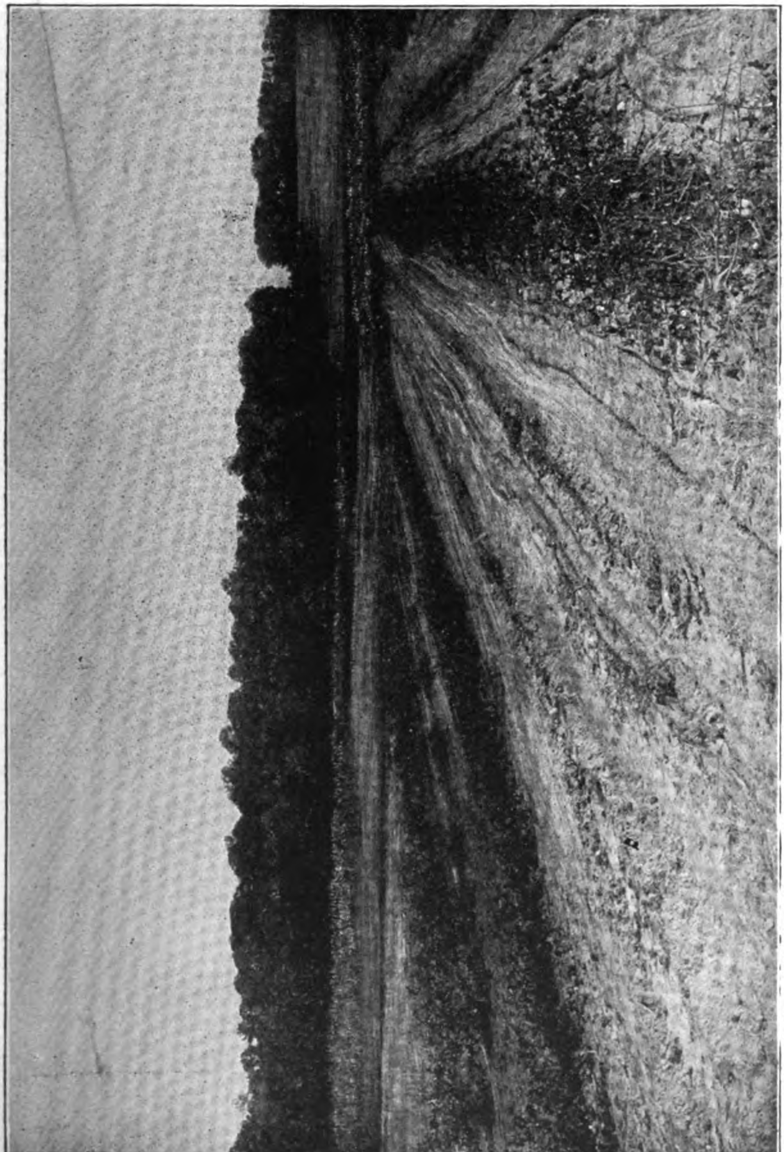
This method, preferred in the past because no better way was then known, involves the cutting or up-rooting, piling, and burning of the cotton plants. (See illustrations pages 30 and 31). It has many points of advantage in controlling the boll weevil, but has also the disadvantage of destroying a considerable amount of the vegetable matter which is badly needed for building up the soil and increasing its productiveness. For this reason we recommend burning stalks only where weevil control by deep plowing is impossible. Burning of stalks should always be followed by the use of a winter growing cover crop.

Burn as Soon as Foliage and Tips are Dry:

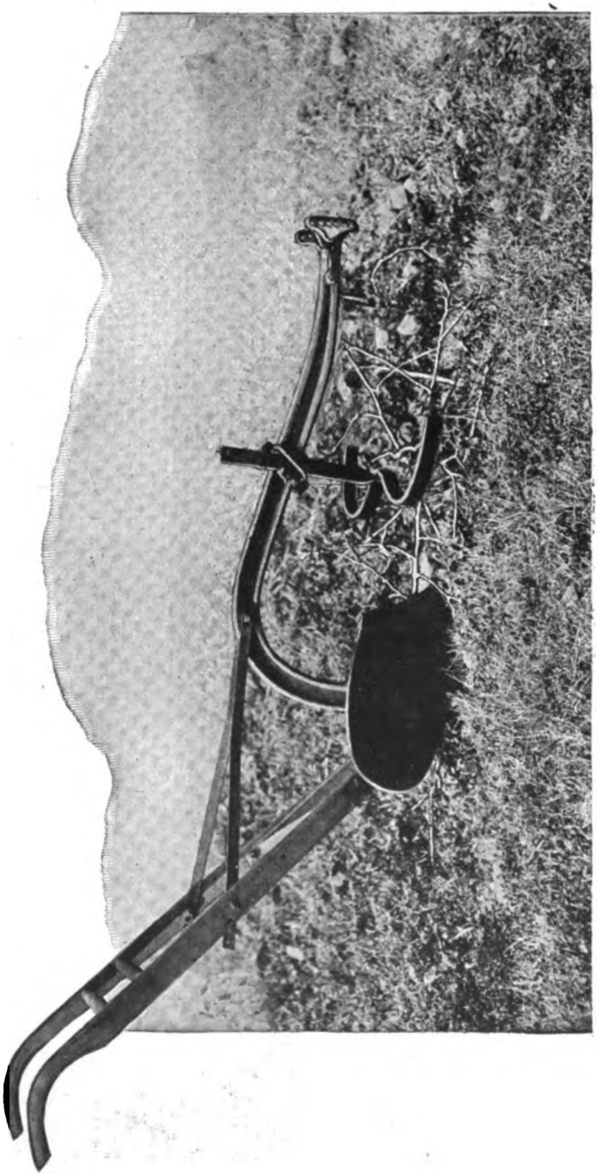
Stalks to be burned should be placed in position to burn while still green to avoid scattering foliage, squares, bolls, etc. The weevils are then concentrated upon the rows or piles of stalks and nearly all of them will remain there until burning can be accomplished. Burn as soon as the foliage is dry enough to produce a good heat, and while the stalks themselves are still too green to burn cleanly. This saves a considerable part of the vegetable matter. Run the fire along the windrows with the wind to burn as fast as possible. (See page 31).



Cutting and windrowing cotton stalks for burning before frost time by use of A-shaped stalk cutter. This device works well on clean loamy soils, without rocks. Not as good a method of control as deep plowing.



Cotton stalks windrowed for burning by piling first and third windrows upon the second as the three were left by the A-shaped stalk cutter thus putting together six rows of small stalks to facilitate burning.



Creswell stalk bender attached to plow beam. This device was invented in Alabama and is of great value in making it possible to plow under deeply and completely even large green cotton stalks, thus both saving the vegetable matter for soil enrichment and at same time controlling the boll weevil by early fall plowing through deep burial.

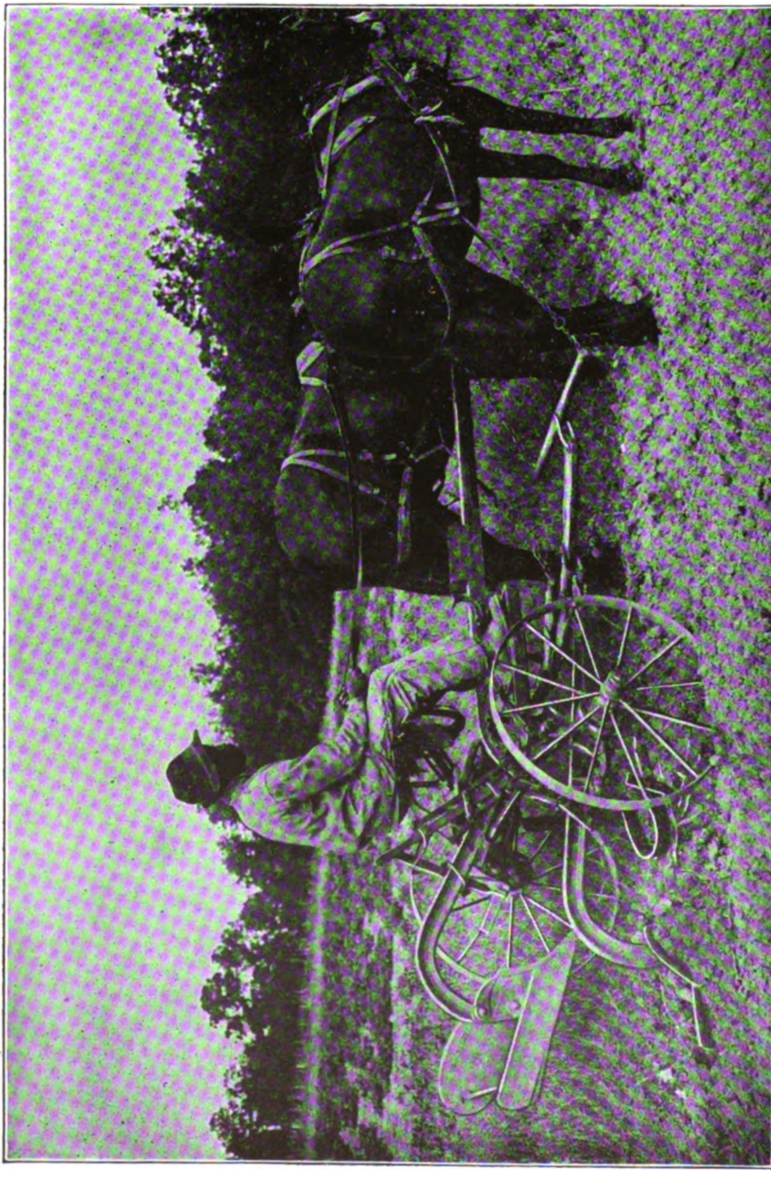
Burning Destroys Weevils in Several Ways:

Burning stalks destroy weevils in a number of ways. First, it will get immediately a large proportion of the weevils already adult and active. Second, it will destroy all immature stages in squares and bolls. The stages developing into late weevils would be the ones most likely to survive the winter. Third, by the removal of all green cotton, weevils which escape fire will be likely to starve to death before they succeed in finding food. Fourth, the destruction of the stalks removes a large proportion of the material which provides most favorable shelter for the weevils during the winter, and weevils still remaining in the field are therefore less likely to find favorable shelter enabling them to survive.

Plowing out stalks leaving them in the way on the surface of the ground. This simply stops growth. No weevil control.

3. Plowing Stalks Under Early Recommended:

The best method of stalk destruction, from the combined view point of good farm practice and also of effective weevil control, is to plow the stalks under deeply and completely as early in the fall as may be possible. This preserves the full humus-making capacity of the cotton stalks, grass and other vegetable matter that may be present. If buried under four, or more, inches of soil so few weevils will be able to escape that weevil control will be practically complete. It is important that farmers should accomplish more work at less expense and this they can do by using more mules and better implements. This is a very important matter in making a successful fight against the boll weevil, and heavier plows are especially important in the burial of stalks deeply enough to control the weevils effectively. Where stalks are unusually large it is better to burn than to bury them, as burial is difficult and they decay so slowly that they interfere with the subsequent cultivation of the field.



A type of stalk bender invented by N. S. Pridgen, Enterprise, Ala., and probably somewhat more effective than the Cresswell bender. The Pridgen bender here shown on the lowered plow of sulky. Field just finished. Stalks put practically "out of sight".

Weevils Escape if Plowed Under Shallow:

It is not possible to do a satisfactory job in trying to plow under cotton stalks in the fall with a light, one-mule plow. With such plowing a large proportion of the adult weevils may escape to find food until frost and then hibernate elsewhere. Even the immature stages in squares and bolls buried lightly may mature and the weevils escape under such conditions.

Stalk Bender is Cheap and Effective Attachment to Plow:

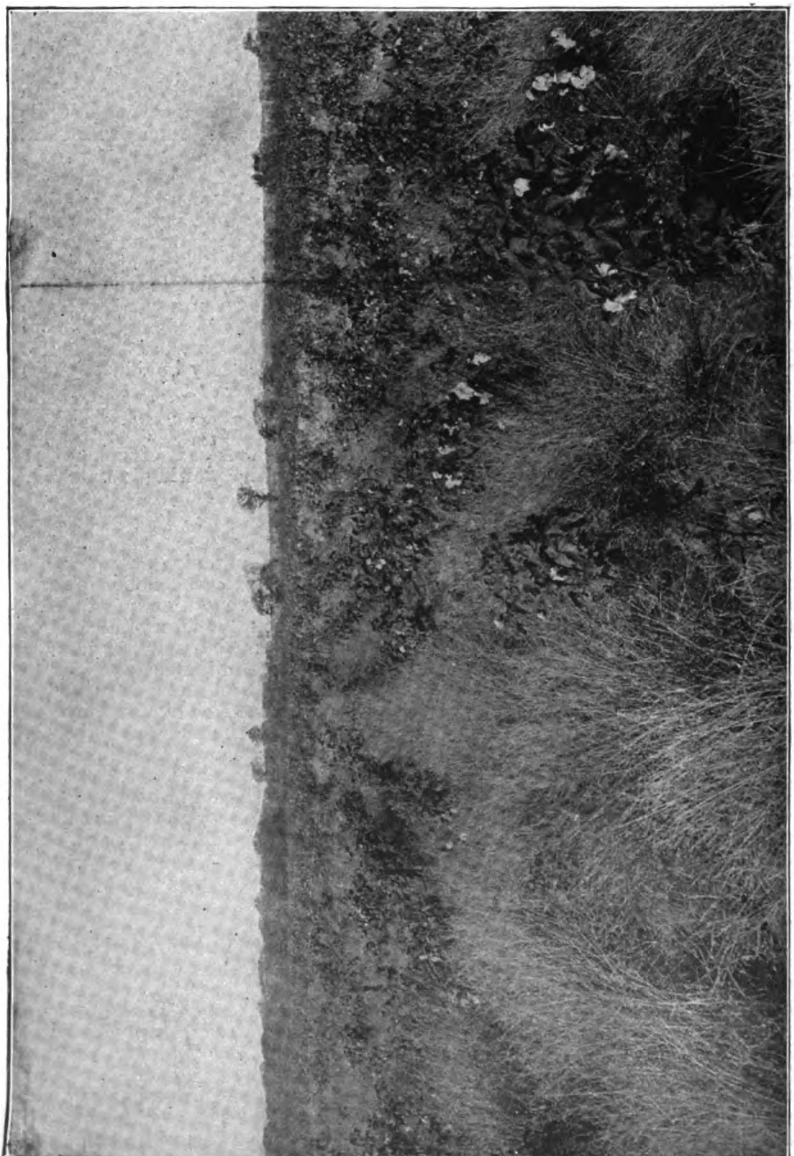
The expense involved for the chopping of stalks can be saved and much more satisfactory burial of stalks accomplished by the use on the plow of a very simple attachment known as a "Stalk bender." There are various forms of stalk benders on the market. These are very simple iron attachments, so made that they can be clamped to the beam of any plow in the position ordinarily occupied by the coulter, see illustrations on pages 32 and 34. The bender gathers in cotton stalks or similar growth and bends it flat upon the ground so that the plow-share following closely behind it turns the soil and completely buries the stalks, grass, etc., in the bottom of the furrow. With this device attached to a good two horse plow it is now possible to completely bury even large cotton stalks without any preliminary use of the stalk chopper. The few tips of branches that escape burial should be chopped off with a hoe and buried after the plowing is finished.

Best Method for Weevil Control in Fall:

The satisfactory burying of green stalks of medium sise now possible with this inexpensive attachment to the regular plows. the economy in time and labor required, the possibility of preserving all vegetable matter for soil building while at the same time obtaining a very satisfactory fall control of the weevils: these together with other favorable considerations which we have not space to mention here, lead us to **recommend the early fall, deep burial of stalks with the aid of the stalk bender as the best method for the fall campaign against the boll weevil.** In our opinion this method avoids the chief objection to the burning of stalks; the destruction of humus-making vegetable matter which most southern soils need very much. It is in line with the best, most progressive and most profitable farm practice of the present time. It will be adopted increasingly by men who own and operate their own lands, by those working under a share rental system and by standing renters who can either make their arrangements by October first or who can arrange for a lease period of more than one year.

Annual Lease a Hindrance:

For the best interest of the land owner who is interested in having soil in which his capital is invested built up, improved in productiveness, and increased in either sale or rental value, and also of the ambitious renter who desires to increase his income and make a better home, with a better living and better educational opportunities for his family, the annual standing rent lease system is the poorest system imaginable. Under it, we can be certain that practically every tenant is going to take out of the land everything that he can get and that he will put into it nothing that will not yield him fullest returns the same year. This means a poor system of farming; a depleted, increasingly unproductive soil and lower crop pro-



Showing indifferent tenant's system of cotton culture. Just across the fence from excellent field, which see on Page 38. Cultivation and V-C Fertilizers make a wonderful difference in results on same type of soil.

Cotton planted very thickly in "hedge-row" system. This style of planting suppresses the growth of the "vegetative" branches, and on medium to rich soils may yield most heavily under weevil conditions. In this field there was a yield of over 1 1-3 bales per acre on stalks not over 3 to 3½ feet high.

duction at greater expense; a poorer farm and a poorer farmer who must keep moving from place to place in a vain search for a better opportunity under a hopeless system.

Clean Up the Farm—Remove the Stumps:

The presence of stumps of dead timber in the field, while bad agricultural practice under any conditions, is especially favorable to weevil hibernation. Dr. S. A. Knapp estimated that the presence of stumps in a field costs the cotton farmer on the average $3 per acre each year. With the boll weevil present, they may cost far more than this, because of the shelter which they and the weeds, growing around them, may give to hibernating weevils. They cost also by preventing the use of improved machinery, which is especially desirable in boll weevil territory. (See p.22).

Clean Ditches, Turn Rows and Fence Lines:

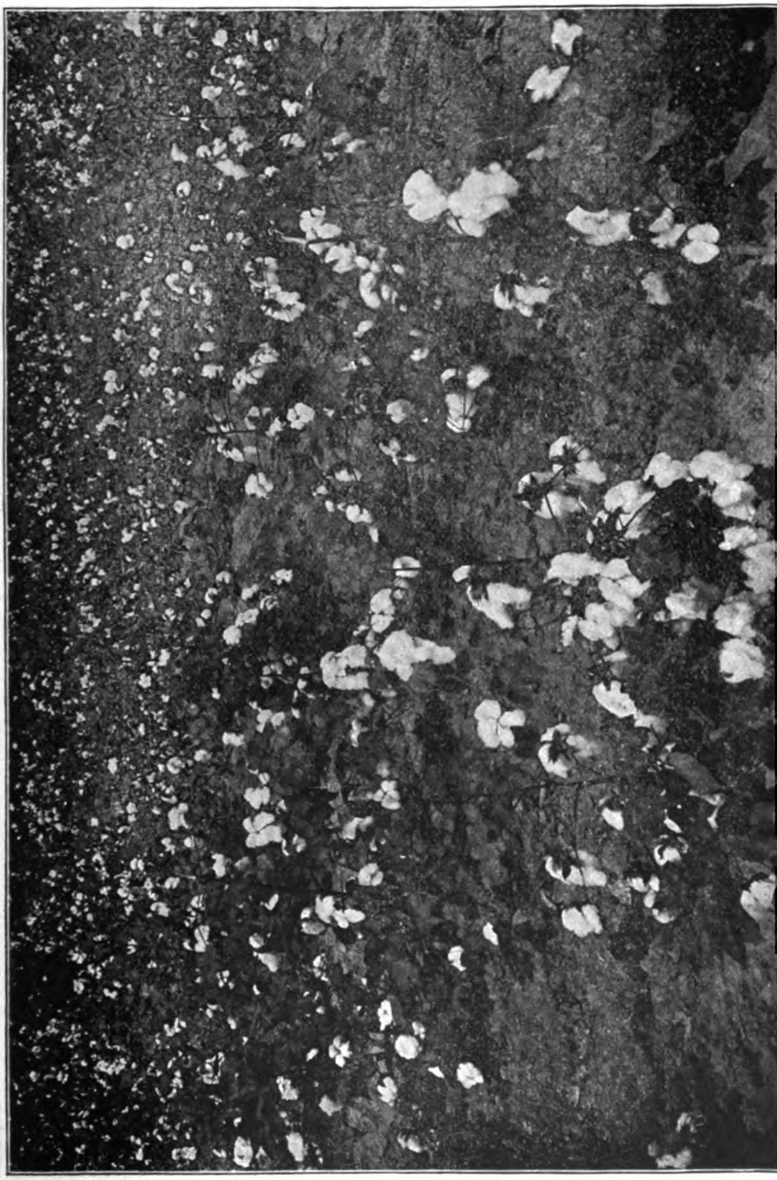
In general, we would say clean up all kinds of rubbish along ditches, terraces, turn-rows, and around the edges of the field to reduce the chances of weevils hibernating successfully. This will decrease the injury done by other insects besides the boll weevil.

Fall Campaign Most Economical:

From the standpoint of combined effectiveness and economy the early fall is the best time in all the year to make the fight against the boll weevil. We have seen (page 29) that where stalks are destroyed by October first only a fraction over one per cent. of as many weevils will survive the winter as will survive if food is left for them until the middle of November or until killing frosts occur. Therefore, with early fall stalk destruction the weevil fight is made far easier for the following spring and summer. The fall campaign is in line with the best farming methods and will involve hardly any extra expense to obtain effective weevil control. If the fall campaign is not made, then the weevil survival, with average seasonal conditions, will usually make it necessary to collect weevils from the young plants at the time squaring begins (see page 19), and also to collect and to destroy infested squares repeatedly during the first month of the fruiting season (see page 19-20). The necessary cost for those two admittedly incomplete methods of weevil fighting will usually be from $2 to $3 per acre. In most cases where the fall campaign is made it will be found unnecessary to make all of this more costly summer fight. The direct saving in labor and expense is evident, but this is not all. We should also consider the value of the increased yield which will be obtained as a direct result of the more effective control of the weevil resulting from making the early fall campaign.

Benefit Certain to Man Who Makes the Fight:

Many farmers ask "What good will it do me to destroy my stalks in the fall if my neighbor does not destroy his likewise?" The answer is that the man, farmer A, who makes the fight will receive practically all of the benefit from what he does regardless of the inaction of his neighbor, farmer B. This is true for several reasons. First, weevils escaping immediate destruction in field A, where stalks are destroyed early, can live at that



A well cultivated and fertilized field giving good yield. Compare with view of poor cotton on page 38.

same season of the year for only about two weeks on the average without food. They must therefore fly to the undestroyed cotton of the neighboring field B, to find food or they will starve to death before it becomes cold enough for them to live without food. The number of weevils hibernating in or around field A, therefore, becomes negligible while that in field B is increased by weevils coming from A. Second, the winter shelter conditions are most favorable in field B where stalks are permitted to stand. Third, we shall assume that both farmers are likely to plant at about the same time in the spring. Weevils emerging from or around field B will therefore find food close by and very few will go further to reach field A. This is true especially because weevils do not fly in the spring nearly as readily as they do in the fall. The movement of weevils increases as the first generation matures.

In a most careful study of this matter, using marked weevils, a number of individuals were followed in their movements in a cotton field for more than six weeks in the spring. During this time many of them had not moved more than fifty yards from the point at which they started. Therefore the movements from field to field is slight as a rule so long as uninfested squares continue abundant where the weevils occur.

Community Co-operation Best:

No man should delay in making the fight because of the lack of co-operation on the part of his neighbors but it is unquestionably better for the whole community if general co-operation can be secured as the danger of an early reinfestation will be correspondingly decreased.

Principal Factors in Natural Control of the Boll Weevil

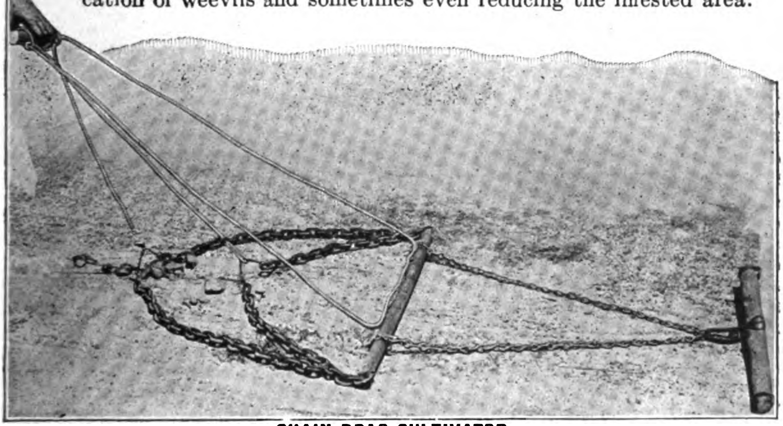
Four Groups of Factors:

There are four principal groups which include the most important of all the natural factors of control affecting the boll weevil. As a result of records made by the agents of the U. S. Bureau of Entomology, from the examination of more than 222,000 squares and bolls collected principally in Texas but representing also conditions in Oklahoma, Louisiana, Arkansas and Mississippi, it appears that these four factors are together responsible for the destruction of more than half of the weevil stages that begin development. In the order of their general importance and with the average percentage of mortality caused by each, they are as follows: 1, Climatic conditions (especially heat and drought in summer), 25 per cent.; 2. Predacious insects ("fire ants" principally), 16 per cent.; 3. Plant resistance by proliferation, 12.5 per cent.; 4. Parasites, 4 per cent. Naturally the mortality from heat and predatory ants is greatest among squares and small bolls which fall to the ground. These constitute about seven-eighths of

the total number of infested forms. The work of parasites is greatest among the small portion (less than one-eighth) of forms which remain hanging, but dry up, upon the plant.

Summer Control by Heat and Drought:

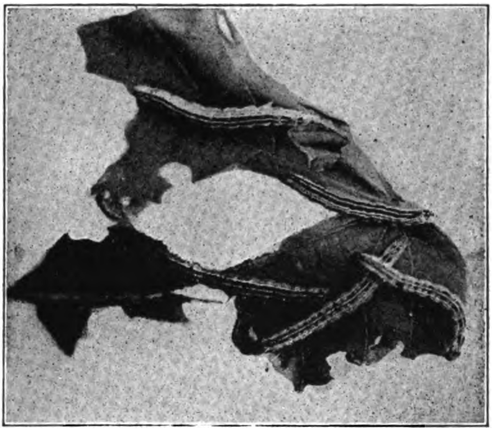
Long periods of extreme heat and drought occuring early in the fruiting season are most effective in checking the multiplication of, the weevils. To exert a very marked effect this period must extend beyond four weeks with maximum temperatures, as recorded by the Weather Bureau, ranging above 90 degrees much of the time. During the first month or six weeks after squaring begins, the plants do not shade the ground very much and weevil stages in fallen squares and small bolls may be more certainly destroyed by heat and drying than will be the case later in the summer when the ground is more completely shaded. This control by heat will be greatest under the extremely dry conditions of western Texas and Oklahoma and least under the heavy rainfall conditions of the Gulf and South Atlantic Coast sections. Heat and drought are the most important control factors during the summer breeding season, limiting the multiplication of weevils and sometimes even reducing the infested area.



CHAIN DRAG CULTIVATOR.

A home-made device that has given good results in dragging infested. fallen squares to the middles where the boll weevil stages will likely be destroyed by the heat of the sun. At the same time it gives ideal cultivation upon many types of soil. Originated by W. E. Hinds.

The control by heat may be utilized to the fullest possible degree if an implement such as the chain cultivator is used. This simple device may be made at home of a heavy log chain and on soils that are not too rocky or of such texture as to bake hard it may give most ideal cultivation. The chains roll the fallen squares to the middle, thus securing also the fullest exposure of fallen infested squares and small bolls to the full control effect of the hot sunshine.



Cotton leaf worm, (Alabama argillacea.)

Cotton Worm Stripping Controls Weevils:

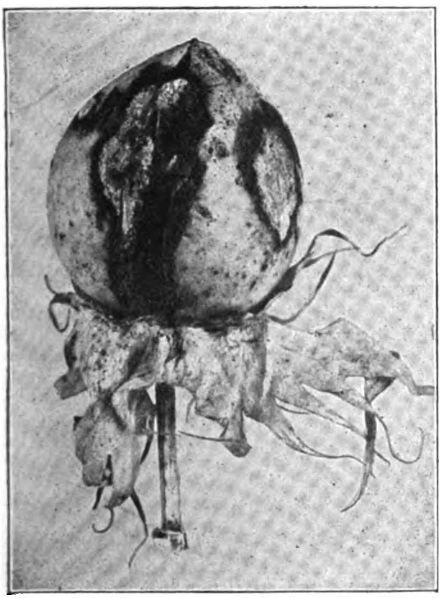
The effect of the cotton worm upon the boll weevil is a very interesting illustration of insect inter-relationship. Both of these species are confined entirely to the same food plant, cotton, although they attack different portions of the plant. They do not in any way attack each other directly, except that where stripping is complete the worms may consume squares which happen to be infested by the weevil, Either species occurring alone is rightly considered a serious pest upon cotton, but when the two species occur together, after half or two-thirds of the squares are infested by the weevil, the cotton worm, by practically stripping cotton and stopping the development of squares and weevils, becomes one of the most effective natural agencies controlling the multiplication of the boll weevil in the fall and thereby greatly reducing the number of weevils occuring the following summer. The benefit is not to the present, but to the succeeding crop and in boll weevil territory the cotton worm should not be poisoned after the boll weevil has infested half of the squares present, but may be considered as a valuable friend and ally of the cotton farmer.

Proliferation in Squares and Bolls:

In response to the irritation or injury inflicted by the weevil to squares and bolls, there commonly occurs a very rapid formation of new cells in the effort of the plant to heal the wounds caused by the weevil. This process of cell formation is called proliferation. The large, soft cells are sometimes formed so rapidly and abundantly that the mass exerts considerable pressure, even bursting through the walls of the affected forms. It thus happens that the weevil eggs may be crushed before they hatch or if they hatch, the grubs or pupae, and sometimes even the newly formed adult stages, will be crushed and destroyed by this abundant proliferation. (See Fig. 6, Plate VI., Page 14.) This plant factor is generally responsible for the destruction of about 12 or 13 per cent. of all stages starting to develop and is therefore one of the most important natural factors in weevil control.

Predaceous Ants Helpful Insects:

About thirty other insect species feed more or less upon some stage of the boll weevil. The most important predatory enemy is the little "fire ant" which occurs already widely distributed through the cotton belt. These ants occur on most types of soil but not everywhere in equal abundance. Where they are numerous they may exert a very valuable control effect upon the boll weevil. These ants are partly, at least, carnivorous and learn to cut their way into the fallen infested squares especially and there feed upon the helpless, tender grubs and pupae of the boll weevil. Occasionally these ants have been found to destroy more than half of the weevil stages in fallen, infested squares but as a rule their control ranges between 12 and 20 per cent. The holes made by ants entering squares resemble superficially the exit holes made by weevils as they emerge but a close examination of the interior of the weevil cell shows that, where ants have entered, the cell is left practically clean and empty. On the other hand when the weevil has emerged there will be left in the cell the remains of shed skins from the weevil stage as it transformed, some conspicuous white particles of excrement voided by the weevil before it ever fed and the fine material torn away by the weevil as it formed the emergence hold through the wall of its cell and of the square.



COTTON BOLL ANTHRACNOSE.

A cotton disease often mistaken for the work of the boll weevil.

Parasites Are Not Dependable:

More than twenty-five different species of insects and four species of mites are known to attack the boll weevil as true parasites. These parasites have other native hosts and simply include the boll weevil as it comes within their range. Parasites attack more commonly the weevil stages in squares and small bolls which dry up but remain attached to the plants. Naturally parasitism may increase somewhat as the weevil infestation becomes older but in no section have the parasites ever shown ability to control the boll weevil practically under natural conditions in the field. Any parasite multiplication must necessarily follow that of its host. The occurrence of parasites is always uncertain and cannot be determined by the ordinary cotton grower. As a general thing parasites have accounted for less than six per cent. of the boll weevil stages.

Birds:

More than fifty different species of birds have been found by the U. S. Biological Survey to have fed occasionally upon boll weevils. Most of these capture weevils during their period of spread in the fall of the year. Few birds occur in cotton fields until after the crop is laid by and their attack upon the weevil in the spring and early summer is insignificant. Among these birds the orioles have appeared to be the most abundant feeders on weevils during the winter months. Valuable as the quail is from other viewpoints it is not important as an enemy of the boll weevil. The quail feeds quite largely upon other insects of various species as well as upon weed seeds, etc., and is entitled to the highest consideration as a beneficial and valuable game bird. The help of birds as well as of insect predators and parasites is welcome but not a certain dependable natural factor in boll weevil control.

Winter Control by Cold and Wetting:

The other extreme of climatic conditions may exert a very important limiting effect upon the survival of weevils during their hibernation period. This is most effective, naturally in the extreme northern limit of their range, and in western Texas, Oklahoma and Arkansas especially where the minimums frequently fall below zero F, has doubtless been the most effective natural factor in limiting the northward spread of the weevils. Occasionally severe winter conditions seem to have reduced the infested area but in no case has this winter extermination of weevils been as widespread or important as in the case of summer control by heat and drought. As a general rule winter conditions of unusual severity simply reduce the number of weevils living through without really exterminating the species and it is not possible therefore to measure accurately the real value of such a control factor.

Winter Temperature Endured by the Weevils:

From a study of Weather Bureau records for many years, it is quite evident that in western Texas, Oklahoma, Alabama and Arkansas especially, the boll weevil has continued to exist though in reduced numbers in territory where the minimum winter temperature has fallen occasionally even slightly below zero Farenheit. This does not mean that boll weevils can survive actual exposure to zero temperature as the shelter within which they are passing the winter may so modify the outside temperature that the actual survivors may experience a temperature considerably above zero F. Certainly where the winter minimum rarely falls lower than 10 degrees F. it may be expected that the weevils will survive the winter in considerable numbers.

Early Frosts:

Extremely early frosts have a decided influence in checking the fall multiplication of the weevils and in reducing the number to enter winter quarters. This occasional control of the weevil by early frosts demonstrates the possibility of controlling it regularly by such general early destruction of stalks as has long been recommended but little practiced in infested territory.

Cultural Methods of Weevil Control More Certain:

After all that we have written about these most important factors in the natural control of the boll weevil it must be apparent to the thoughtful reader that they are to be considered as entirely secondary to the far more certain control by artificial cultural methods. It is possible for the farmer under average conditions to assure himself of a good crop in spite of the boll weevil, so far as seasonal or climatic and soil conditions may permit, but it is only by utilizing the factors of hard intelligent and timely work and never by depending upon a kind Providence to do it for him while he loafs two-thirds of the time.

Weevil Effect Upon Yield of Lint Per Acre

Boll weevil effects upon cotton production are shown most accurately by the actual yield of lint cotton per acre. The period covered by this study extended for twenty-two years from 1893 to 1915. In the beginning of this period the weevil had just entered Texas but did not affect the yields of that State appreciably before 1896. It must be borne in mind that in 1912 Louisiana was the only state that was wholly infested. The general upward or downward tendency of cotton yields is shown in tables 1 and 2 by comparisons for 5 and 10 year periods. In this way, variations in seasonal conditions are averaged and comparisons are, therefore, put upon a more accurate basis.

Infested States

Average Cotton Yield Per Acre By 5-Year Periods:

Period	Texas Lbs.	Louisiana Lbs.	Mississippi Lbs.	Arkansas Lbs.
1893–97	196	259	216	167
(a) 1898–1902	191.6	266.2	202.8	220.8
1903–07	169	228	212.8	192.6
1908–12	174.8	156.2	185	187.2

(a) This line indicates approximately the time that weevil effects became noticeable upon state yields.

Average Yield Before and After Infestation:

	Lbs.	Lbs.	Lbs.	Lbs.
Before	193.8	251	210.5	226.8
After	171.9	156.2	185	187.2
Decrease after Infestation, %	11.3	38	12	17.5

One state wholly infested decrease averaged 38 per cent. Three states, each one-half infested, decrease averaged 13.6 per cent. Had these states been wholly infested, we would expect the loss to have been about 27 per cent. This decrease, taken with the net increase, in uninfested states of 10.8 per cent., indicates that actual direct boll weevil injury in the infested area has amounted to 37.8 per cent. Compare this statement with conditions in Louisiana, where the decrease was actually 38 per cent. Evidently most of the decrease in state or county yields beyond 35 to 40 per cent. may be chargeable to reduced acreage in cotton, as a general rule. Note again that these figures are based upon average yields of lint per acre and that, therefore, reduction in acreage is not a factor in producing this average loss of 38 per cent.

Uninfested States

Average Cotton Yield Per Acre By 5-Year Periods:

Period	Alabama Lbs.	Georgia Lbs.	So. Carolina Lbs.	No. Carolina Lbs.
1893–97	167	176	210	199
1898–1902	164.2	180.8	183.4	194.4
1903–07	170.	183.6	200.6	217.8
1908–12	173.6	192.8	231.2	212.6

Average Yield By 10-Year Periods:

1893–1902	165.6	178.8	191.7	196.7
1903-12	171.8	187.2	215.9	215.2
Increase Second Period,	10.4	10.5	11.3	10.9

Four uninfested states show an average increase of 10.8 per cent. in second 10-year period. This increase is probably due principally to the greatly increased use of commercial fertilizers in this section and during this period particularly but also in part to use of better seed and better cultural methods generally.

Conclusions Regarding Climatic Effects

It is evident that no important cotton sections of the southeastern states can hope to escape weevil infestation. In the counties within 100 miles of the coast cotton production is certain to be greatly decreased by the boll weevil. It is quite possible, however, even within the 18-inch to 16-inch summer rainfall zone that some of the best farmers will continue to make fairly good yields of cotton in spite of the weevil but through this territory and in the 16-inch and 14-inch summer rainfall zone as well it will certainly be folly to attempt to maintain an all-cotton system.

The decrease in cotton production by county yields has been extremely heavy-ranging from 65 to 83 per cent. in all territory having an average of more than 14 inches of rain in June, July and August. Note the location of this area on the map—(pages 46 and 47). In most of this area cotton has proven so uncertain a crop with the boll weevil present that other more profitable crops livestock production etc. have been substituted for it. Extreme reduction in cotton acreage and increase in diversified farming is absolutely necessary in this area. The acreage in cotton should be kept down to not more than 5 acres to the plow and this amount may be cared for successfully by the progressive farmer who makes sure of his living from other products so that neither he nor the business man who is dependent upon him will be ruined if the weevils should destroy all the cotton crop.

In the area having less than 14 inches of June to August rainfall there is a fair chance to beat the boll weevil by using the cultural methods recommended. The safe acreage may be taken as approximately the number of acres per plow indicated by the difference between the number of inches or rainfall occurring in summer and the number 20: e. g. This would indicate 4 acres in the 16-inch zone; 6 acres in the 14-inch zone and 10 acres in the 10-inch zone, etc. The conditions found in most of the Texas and Oklahoma country do not occur East of the Mississippi River.

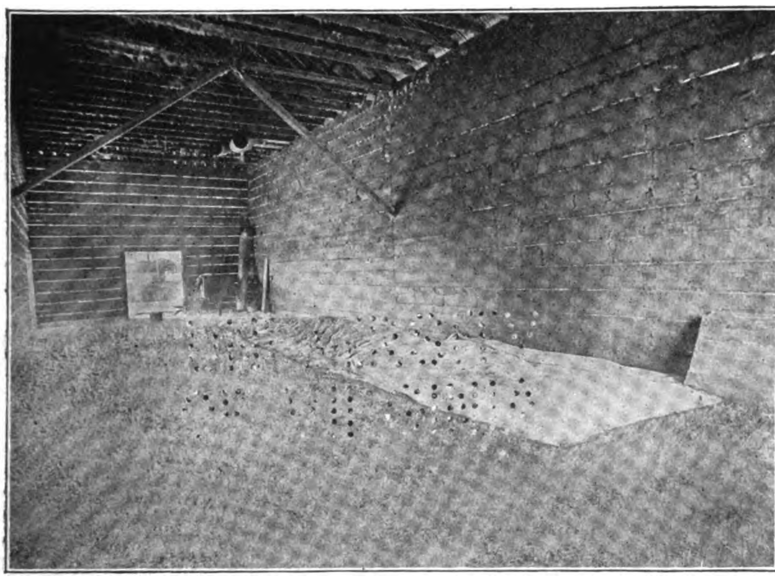
Essentials to Successful Weevil Campaign

1. Hold Farm Labor:

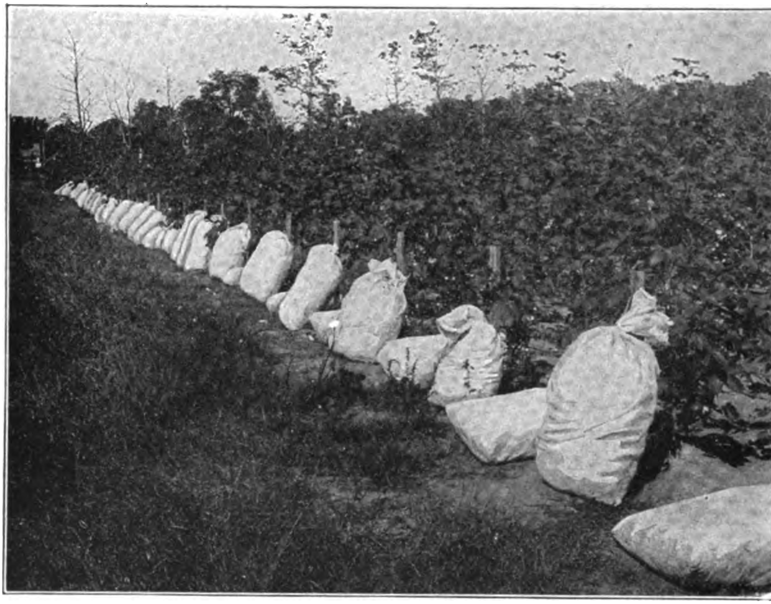
This is a matter of the utmost importance as land without labor to work it becomes nonproductive and unprofitable. The sections which have suffered most heavily from the weevil invasion lost far more because they let their labor go than from any direct injury done by the weevils.

2. Smaller Acreage and Better Cotton:

Reduction in acreage planted in cotton to what can be given the better care that is absolutely required under weevil conditions is a long step toward success. Especially when the rainfall is less than 16 inches during June, July and August, cotton culture on a small scale can be continued profitably in spite of the boll weevils where such methods are followed as are recommended in this booklet.



Catching weevils in a seed house. Victoria, Tex., where marked weevils were fed into the gins with the seed cotton. A large percentage was recovered in the seed house. Seed from infested sections should not be planted in uninfected areas. This is one of the main reasons for boll weevil quarantines.



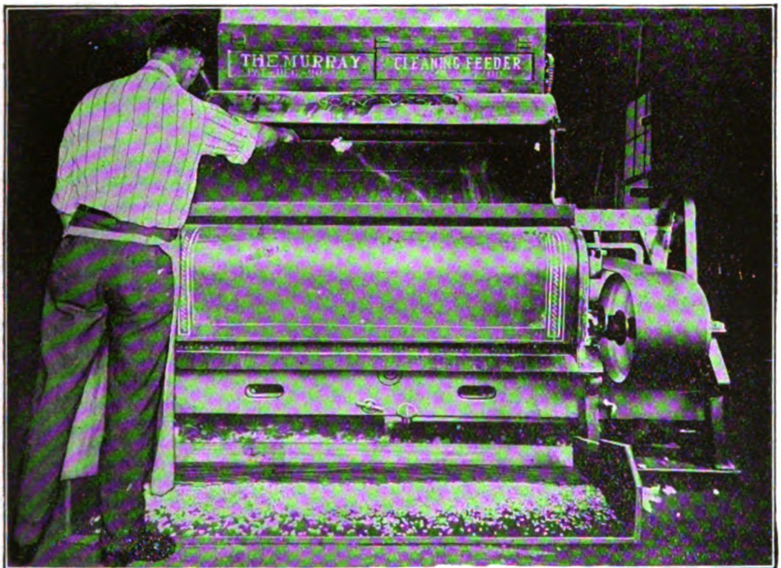
Partial view of cotton-variety plat. Yield, seventy-five varieties grown in competition as to yield adaptability to boll weevil conditions, etc.

3. Increase Food, Forage and Livestock:

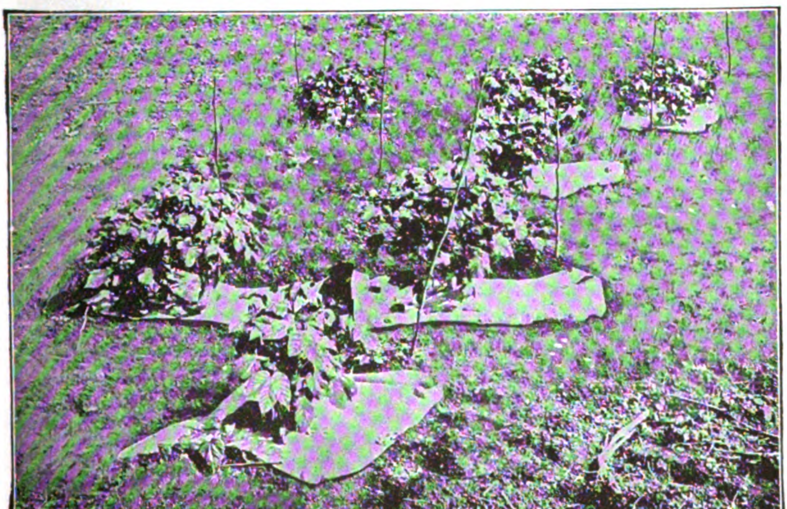
With the advent of the boll weevil it has been found necessary for cotton farmers to raise as much as possible of their food and forage crops instead of depending upon the proceeds of their cotton crop to buy such products from other sections. Instead of sending out of each southern state possibly more than $100,000,000 a year for food and forage as we have been doing under the all-cotton system, most of this immense sum can be kept at home as cotton farmers learn to feed themselves. Prosperity will then increase amazingly.

4. Reducing Advances on Crop Liens:

Necessarily for the protection and best interest of both the farmer and the advancing party, these advances must be reduced in weevil territory. The reduction should be made gradually during a period of years to enable both parties to become accustomed to the new conditions and to institute such changes as are required thereby. One imperative condition in these reductions is that they shall not be made complete at once or carried to such an extent as to seriously cripple the farmer in his production of farm crops or other desirable products. Advances should be conditioned upon the



Running marked weevils through gin saws. It was found that over 75 per cent of the adults entering the gins with the seed cotton passed through uninjured and came out mixed with the seed.



Poisoning weevils with Paris Green on trap volunteer plants in South Texas. The weevils were marked and closely watched. Many lived for many days uninjured on these heavily poisoned plants.

farmer making such changes in his system of farming as the local situation may require. As a rule, he should assure at least the raising of all corn and meat needed to carry him through the year.

5. Maintain Total Value of Farm Products:

With a diversified system of farming even the average man can be helped, through wise leadership, to maintain at least the total value of his farm products for the year. The chances are good that this total value will be greatly increased while his living expenses are actually decreased and the standard of living for the whole community may be steadily raised.

6. Provide Markets For New Products:

In the disposal of the surplus from these new farm products the farmer needs the assistance of business men who may help him to solve the problem of markets. Many such products cannot be disposed of locally. Chambers of Commerce as well as individual merchants, are helping in this important work of marketing. Numerous associations of farmers to co-operate in the selling of their products are being formed as a result of this need for markets. In the moving of such products locally, the matter of reasonable and equitable local freight rates is an extremely important factor. Railroads are showing their willingness to assist in this respect.

7. Longer Leases:

The annual lease system is a constant and serious hindrance to desirable changes and improvements. Wherever possible, as with many of the best tenants on a farm, the lease period should be extended to three or five years. The farmer can then know that it will benefit him to go ahead with his fall campaign against the boll weevil, to use winter-growing cover crops, to build up his soil, to raise livestock, etc., as he will never do under the annual system. Where the annual lease is still maintained, it will help greatly if such arrangements can be settled by October first, rather than two or three months later.

8. Improve Soil by Legumes and Livestock:

The most economical, profitable and permanent system of farming includes both of these factors as essential elements in soil building. This is one of the most important elements in a successful campaign against the boll weevil as also in the solution of many other of our southern rural problems.

9. The South Must Feed Herself:

Such changes will carry us a long way toward the fulfillment of this slogan. The coming of the boll weevil is helping us to realize the necessity for it as we never have before. Prosperity through these states as a whole will increase as we approach this standard, for the welfare of the town and city, of the business and professional man as well, is ultimately conditioned upon, and largely measured by the preceding prosperity of the farmer.

10. Make Farm Life Satisfying:

It is not enough, however, for us to look merely at the size or variety of farm crops, or even at the amount of profit that the farmer may obtain from his year's work. We cannot fail to realize that this alone will never solve what we consider today as many of our most important rural problems. There must also be the **enlarging of the life** of those living on the farms. This means the improvement of the means of communication by better roads, rural mail deliveries, telephones, etc. There must be the improvement of the rural school facilities so that the children of the farmer may have within their reach practically as good common school training as is open to the young people of the town. The country church is another important factor that cannot be overlooked. A high moral atmosphere is one of the most valuable assets of any community and certainly no less so in the country than it is in the town. There must be a higher development of its

A Farm Home in Lee County, Ala. All modern conveniences.

social life in the country community. And finally, but by no means least, the increased prosperity of the farmer must find expression also in the improvement of the farm house. Better houses, neatly kept and painted, with more conveniences and comforts in them, for the housewife especially, but for every member of the household as well, will go far toward making the farm life attractive and satisfactory. The health of the family must be safeguarded especially through the maintainance of simple and inexpensive sanitary closets, thus helping to save on doctors' bills and making the farm home a healthier and happier place in which to live.

Strange as it may seem to many, the coming of the boll weevil is clearly and definitely helping to bring about progress along every one of these lines, and the campaign that is made against the weevil is the agency through which many of these more satisfactory changes for our country life are being accomplished.

11. Fertilization:

The most successful farmers in the weevil infested territory find that the wise use of commercial fertilizers is fully as **necessary** and may be as profitable with, as it has ever been without, the weevil. The questions as to the best kinds and quantities of fertilizers to be used can be answered best only through the study of actual results obtained in any given field and the intelligent farmer will study this matter closely. General conclusions may be based on careful tests on evidently similar soil types. In a general way the same principles of fertilization apply with the boll weevils as without them. The principal variations from ordinary practice will be found (1), in the more general use of acid phosphate to aid in maturing bolls rapidly; (2) the careful and limited use of commercial nitrogen so as to avoid producing an extremely heavy foliage and vegetative growth and, (3), in applying the usual fertilizers for cotton either before or at the time of planting as the object is to **force the rapid growth and fruitage early** in the summer because the weevils may be expected to take the late cotton anyway.

12. Varieties of Cotton For Weevil Conditions:

First of all we may emphasize the fact that there is no "one best variety" of cotton for all conditions. There are many good varieties and from this list the cotton planter should select such as best suit his conditions. The real basis finally is that of actual experience, of the demonstrated ability of a variety to produce the best yields under the best agricultural conditions that the farmer is able to maintain.

There are several general points that should be considered in choosing varieties. (1) Where cotton fields are affected by the fungus disease known as "wilt" only varieties which have been carefully selected for wilt-resistance should be considered. Among the wilt-resistant varieties Lewis' No 63 Council-Toole and Covington-Toole are among the most early maturing and widely grown. (2) Varieties producing a very high percentage of lime (over 40 per cent.) are usually very susceptible to anthracnose or boll rot (see page 42) and where this disease occurs it can be best controlled by using less susceptible varieties carefully selecting seed from plants showing no trace of the disease; having seed ginned carefully in a clean gin and rotating crops.

For boll weevil resistance we should select for the lighter types of soil some of the medium sized boll and moderately large-growing types of cotton such as Cook, Triumph, Cleveland, etc., etc. The lighter soil holds down the size of such varieties and they usually yield better than do the smaller bolled varieties.

On rich soils, however, these varieties are liable to produce too heavy foliage and too late growth. Therefore, on the richer soils plant some of the more prolific, smaller bolled, early maturing types such as Kings Improved and Simpkins Prolific, Broadwell or other derivatives from King. Trice is also a good variety of early maturing character.

A very rank growth of cotton such as is exceedingly favorable to boll weevil multiplication and damage. Such stalks cannot be buried but must be burned for weevil control.

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9. **Citrus Fruits and Truck Crops.**

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12. **The Boll Weevil and How to Fight It.**

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    A Practical Discussion of Soil and Fertilizer Problems.

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April
Nineteenth
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Virginia-Carolina Chemical Co.,
Richmond, Virginia.

Dear Sirs:

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Respectfully yours,

Luther Burbank

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Northern and Western Grown

The prosperity of the American farmer is based on corn. And the foundation for this prosperity was laid by the Indian squaw, who by crude methods of culture, supplied her family with corn for bread. But the crooked stick and hoe as tillage implements have been abandoned. Improved implements have increased the acreage that one man can handle and their use combined with better fertilization are enabling farmers to obtain larger yields than were ever secured before on the same land.

Big yields of corn are secured as the result of the union of many small factors, just as a large river is formed by the union of many small streams. The physical, chemical and bacterial conditions of the soil as affected by the rotation of crops and cultural practices, the use of good seed, the use of fertilizers and the control of insect pests are all important factors which should receive the careful consideration of every farmer.

Fertilization Replacing Virgin Fertility

A few years ago there was much talk about the inexhaustible fertility of the Corn Belt soils. It has since been found that all soils may be exhausted. It takes longer to exhaust some than others but depletion will come unless the crops are properly rotated and fertilized. Some of the Corn Belt soils have been so badly depleted that profitable crops are no longer produced. However, the increased culture of legumes, the conservation of crop residues and the liberal application of fertilizers have saved thousands of farms from exhaustion.

Fertilizer Supplements Manures and Legumes

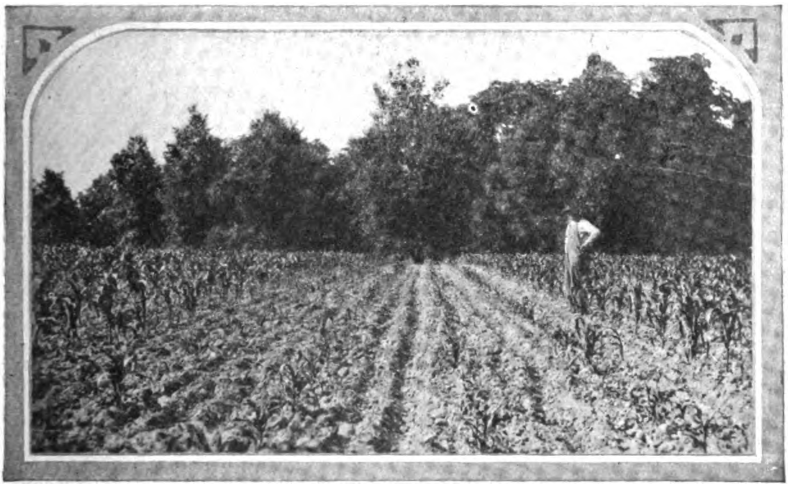
By the use of legumes, manures and fertilizers much land that was once badly depleted has been restored to a high state of productivity. The old method of relying entirely on farm manure is no longer considered adequate. Many farmers feed only a small portion of the crops grown, consequently little manure is produced. Many of these farmers are finding that high yields may be profitably maintained by the liberal use of fertilizer applied in connection with crop residues and legume manures. Those who use manure liberally have found that phosphate may be applied with profit. Farm manure is deficient in phosphorus, the same element in which most soils are deficient. The use of V-C acid phosphate as a supplement to manure is very profitable. It increases the yield and hastens maturity.

Soils Adapted to Corn

Corn is adapted to as many different kinds of soil as any other general farm crop. It is successfully grown on clays, loams, mucks, sands and all the intermediate types of soil. It does best on well drained loam soils that are well supplied with organic matter. On poorly drained soils it does

BUMPER CORN CROP, ELROY, WISCONSIN.
The result of careful seed selection, thorough cultivation and abundant fertilization.

One ton of clover hay contains about 40 pounds of nitrogen. On soils that are not distinctly acid at least two-thirds of this will be gathered from the inexhaustible supply of nitrogen in the air. Where corn is the most important crop, clover should be grown in each field once every three or four years and all of the second crop or a part of the first crop plowed down, If two crops of corn are grown in succession the first crop should follow clover and the supply of farm manure should be spread in preparation for the second crop.



EFFECT OF FERTILIZER

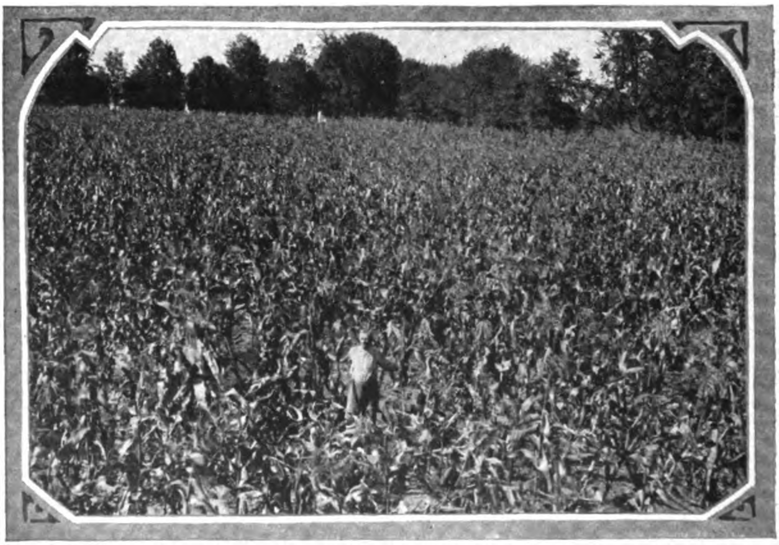
Corn in the center received no fertilizer. That on either side was fertilized with V-C. Farm of Lincoln Bolinger, Fort Wayne, Indiana.

Liming the Soil

Lime is applied primarily for the purpose of correcting soil acidity so that legumes, especially the clovers, will thrive. Its value for this purpose has been long recognized but its direct and indirect effect on the corn crop is just beginning to be appreciated. On the North Vernon and Worthington Experimental Fields of the Indiana Station an application of limestone on land cropped to corn, wheat and clover, increased the yield of corn 5.7 bushels to the acre for the first three years, before corn followed clover that had been limed, and 13.8 bushels to the acre for the next two years, when corn followed clover that had been limed. The Ohio Station has secured an increase of 7.5 bushels of corn to the acre from the use of lime for thirteen years. In the experiments cited the average increased yield of one crop of corn would pay the cost of applying limestone.

The Kind of Lime to Apply:

Three forms of lime are frequently used for agricultural purposes—burnt or lump lime, hydrated lime and ground limestone. For the purpose of neutralizing soil acidity 56 pounds of burnt lime is equivalent to 74 pounds of hydrated lime and 100 pounds of ground limestone. On this basis and also for the results obtained ground limestone is nearly always the cheapest form of lime the farmer can use. It is not advisable to use coarsely ground limestone because it is very slowly soluble. Four-fifths of the ground stone should be as fine as corn meal.



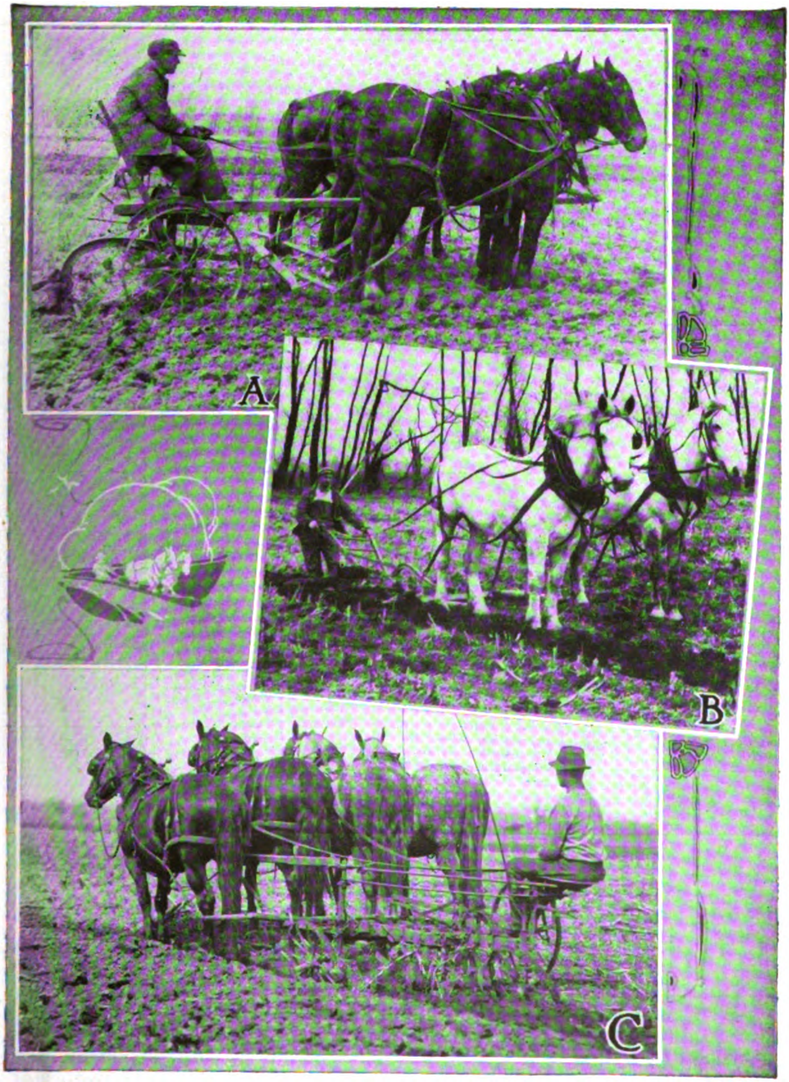
WHAT V-C FERTILIZER DOES.

V-C Fertilizer has given me excellent results for years. I applied V-C at planting and side-dressed with V-C at last plowing: and have the best corn I have ever grown. I heartily recommend V-C Fertilizer.—Milton Holaday, Westboro, Ohio.

Rate and Method of Applying Lime:

Limestone should be applied at the rate of two to four tons to the acre, depending on the degree of acidity. Usually two tons will be sufficient. It can be best distributed with a lime spreader. This implement can be regulated to sow from 1,000 to 8,000 pounds per acre. If the bottom of the manure spreader is covered with a six inch layer of half-rotten straw or manure, a layer of limestone may be put on top and spread satisfactorily. Limestone is also spread by hand with a shovel. Care should be taken to get it uniformly distributed.

Limestone should be spread after the land is plowed and before the seed bed is made. It may be applied before corn or small grain. It will not be necessary to make a second application of two tons to the acre within five or six years after the first application is made.



BREAKING THE LAND

A—Illinois Corn Belt Farm of W. L. Dunham, Wayne, Illinois.
B—Spring plowing.
C—Gang plow and splendid draft team, Purdue Farm, LaFayette, Indiana.

Corn Fertilization

The most essential factor in securing a good corn crop is to have a supply of available plant food sufficient to meet the needs of the crop. Corn not only requires an abundance of plant food, but requires it in available form. The following table shows the amount of plant food taken out of the soil by corn and some other important crops.

Amounts of Plant Food Removed Per Acre by Crops

Crop	Nitrogen	Phosphoric acid	Potash
Corn—			
Grain, 75 bus	73	29	24
Stover, 2½ tons	39	14	50
Total	112	43	74
Wheat—			
Grain, 30 bus	31	17	9
Straw, 2,700 lbs	12	4	20
Total	43	21	29
Oats—			
Grain, 60 bus	35	15	11
Straw, 1 ton	13	5	24
Total	48	20	35
Timothy, 2 tons	43	14	54
Barley—			
Grain, 30 bus	22	11	7
Straw, 1,500 lbs	14	3	30
Total	36	14	37

By glancing at the table it can be readily seen that corn requires more plant food than any other of the principal crops. Few soils contain sufficient amount of available plant food to meet the needs of corn. Well drained clay and loam soils that are kept well supplied with lime and organic matter will furnish a sufficient amount of available potash. If legumes, especially clovers, are grown frequently and these are handled as previously suggested there will be little or no profit secured from the use of nitrogenous fertilizer.

As most soils contain only a small amount of total phosphoric acid the supply of this element can not profitably be allowed to diminish. This means that heavy phosphate fertilization will be required. Such fertilization is not only essential, but very profitable. The Ohio and Indiana Experiment Stations have both shown that $1.00 spent for acid phosphate is giving on the average more than $5.00 worth of increased crops. Such

CORN BELT PETS
Why play with dolls when we have corn-fed pigs?

returns can not be secured on all kinds of soil nor from very large applications of high-grade acid phosphate (500 pounds or more), but they are being secured on average soils where the total amount of 16 to 20 per cent. acid phosphate applied does not exceed the equivalent of 125 pounds per acre per annum. By this is meant that in a three year rotation of corn, small grain and clover 375 pounds may be profitably applied during the three years. On many of the thinner soils, especially where systems of grain farming are followed, more than this may be used to advantage. Experience and experiments have shown that such applications of acid phosphate applied and well worked into the soil before planting corn will increase the yield 6 to 12 bushels to the acre. On some of the thin soils, much larger increases are frequently obtained.

Fertilizers for Clay and Loam Soils:

When these soils are well supplied with lime and organic matter the only fertilization that will prove profitable in the Corn Belt region is phosphate. V-C acid phosphate containing 16 to 20 per cent. phosphoric acid may be profitably applied in quantities ranging from 100 to 300 pounds per acre. On soils of this class that normally produce less than 40 bushels of corn to the acre V-C fertilizers containing 10 to 14 per cent. phosphoric acid and 2 to 4 per cent. of potash should be used. If the soil is poorly drained, cold, and not well supplied with decaying vegetation a fertilizer containing 2 to 3 per cent. nitrogen, 10 to 12 per cent. phosphoric acid and 3 to 4 per cent. of potash should be applied at the rate of 150 to 300 pounds per acre. The addition of nitrogen is needed to give the corn an early start. On all the better soils the fertilizer should be drilled broadcast and harrowed in just before planting corn.

Fertilizers for Sandy Soils:

This class of soils should never be planted to corn too frequently. Corn should follow a legume or a winter-cover crop so that the moisture conditions may be favorable. Where these conditions are met and the soil is in a good state of fertility an application of 150 to 400 pounds to the acre of V-C fertilizer containing 8 to 12 per cent. phosphoric acid and 3 to 5 per cent. of potash should be made. On the poorer grades of soil the fertilizer may contain 2 to 4 per cent. of nitrogen to advantage.

Fertilizers for Muck and Black Sandy Soils:

These soils are well supplied with nitrogen but are much deficient in potash. For this reason nitrogenous fertilizer is unnecessary. A fertilizer containing 6 to 10 per cent. of phosphoric acid and 10 to 15 per cent. of potash may be applied at the rate of 200 to 400 pounds per acre.

Fertilizers for Corn on General Farms:

The recommendations for fertilizing Corn already given apply, mainly, to farms in the Central Corn Belt. On general farms the practice is similar in most respects but, because of soil and cultural differences, the amounts and grades of fertilizers applied vary.

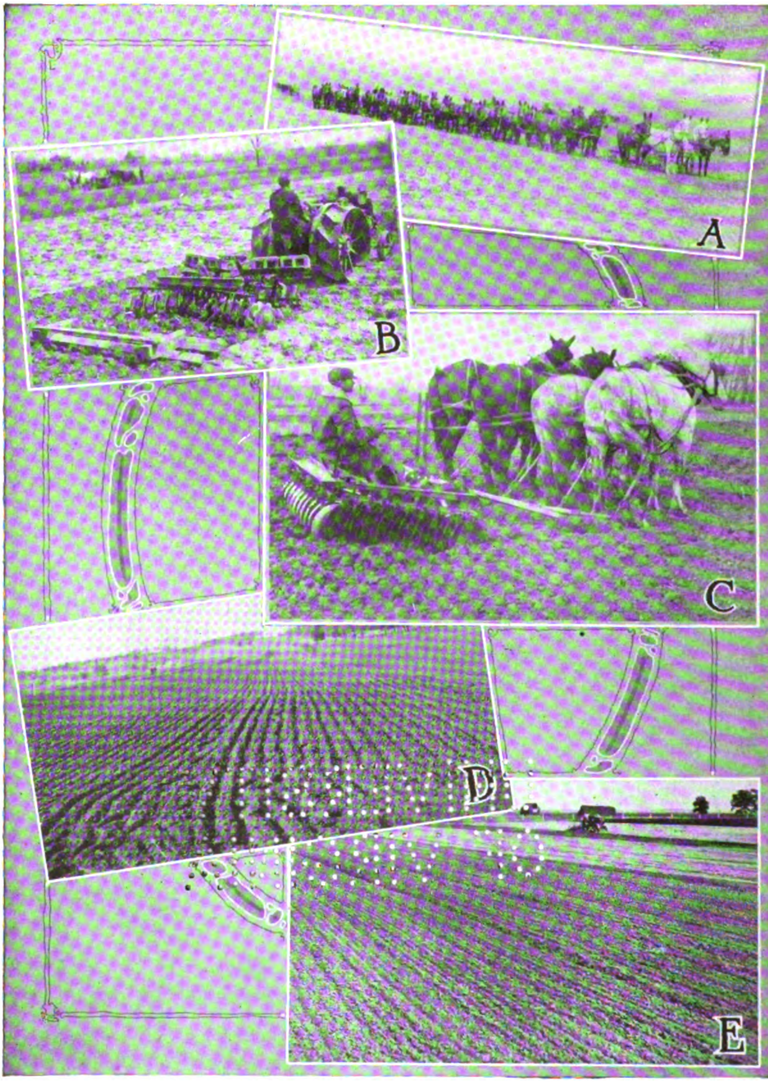
Where considerable live stock is kept and a definite rotation followed, Corn usually follows sod and is fertilized with barnyard manure which should be supplemented by 100 to 300 pounds per acre of high grade Acid Phosphate on heavy soils, or by 200 to 400 pounds of commercial fertilizer carrying 12% Phosphoric Acid and 2 to 4% Potash on light soils. The Acid Phosphate is always necessary to hasten maturity and increase the yield. On cold soils and in backward seasons 1 to 2% Ammonia in the fertilizer will give the Corn a quick start before the ammonia in the manure becomes available.

Where the amount of manure available is small, a complete commercial fertilizer should be applied. Where the Corn follows sod, 2% Ammonia may be enough, while a soil deficient in humus should receive a fertilizer

containing 4% Ammonia. 8 to 12% Phosphoric Acid should always be applied. If the corn does not use it all, the small grain which follows will utilize any that is left. The amount of Potash which the fertilizer should contain will vary according to the soil. A heavy clay soil will only need 2% Potash and a loam soil 4% while a light sandy soil requires 6%. Ammonia is the only plant food which will be lost if not used by corn so the practice in applying Phosphoric Acid and Potash should be to apply too much rather than too little.

TWELVE FEET TALL

George P. Smith, Sounderland, Mass., is proud of this bumper stand of corn fertilized with V-C.



PREPARING THE SEEDBED

A—18 teams discing 2,000 acre corn field in Illinois Corn Belt.
B—Tractor pulling plain disc, saw-tooth disc and drag.
C—Discing with four-horse team.
D—Well broken.
E—Ready for planting. Such preparation followed by proper fertilization brings heavy yields.

On some of the vegetable (muck) soils that refuse to produce any corn without potash fertilization a fertilizer containing more potash should be applied, or an application of 100 pounds of muriate of potash should be applied per acre once every three or four years in addition to the fertilizer recommended above.

How to Apply Fertilizer:

Fertilizer for corn may be drilled through the fertilizer attachment of the corn planter or applied with fertilizer attachment of grain drill. Fertilizer drilled in the rows causes a rapid early growth but the corn is apt to "fire" later in the season. In such cases the yield is frequently reduced. Row drilling a part of the fertilizer may be advisable where root lice are troublesome.

CORN PLANTER

This implement opens the furrow, sows and covers the fertilizer. opens a second furrow, drops and covers the seed, pressing down the soil by means of the roller.

When the application exceeds 200 pounds per acre broadcast drilling all or at least one-half the fertilizer is preferable for the reason that root development is more uniform and the residue left in the soil will be of greater value to the succeeding crop. When the fertilizer is drilled broadcast the corn is less likely to fire in dry weather.

Fertilizer may be spread with lime sowers, end-gate seeders and by hand. When acid phosphate is used as a supplement to farm manure it may be scattered over the manure in the stable, or spread over each load of

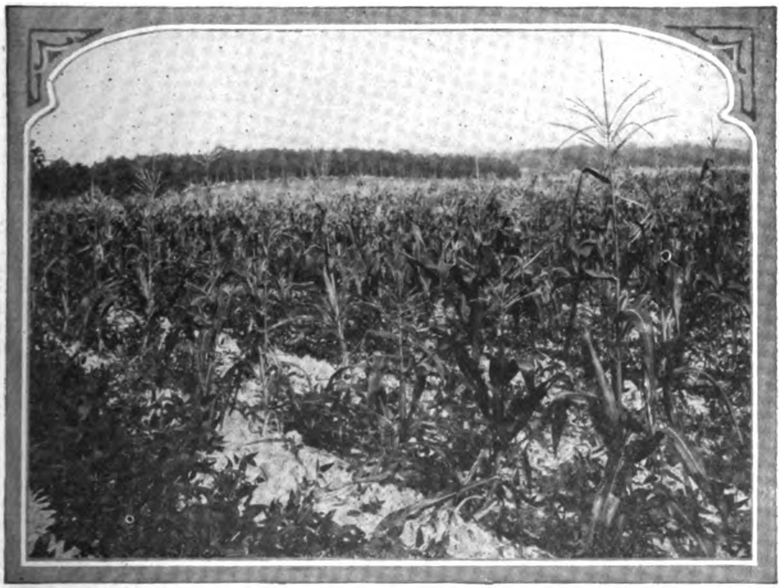
HOGGING DOWN
Hogs on soy beans planted between the corn rows.

manure before it leaves the barnyard. When manure is to be applied at the rate of six loads to the acre 30 to 50 pounds of V-C Acid Phosphate should be scattered over each load.

When to Fertilize:

Corn should be fertilized on all except the newly cleared fertile soils. It will not pay to use fertilizer as a substitute for good farming. It will pay best when used as a supplement to good farming. In all such cases the fertilizer should be applied and worked into the soil before planting the corn or at the time of planting.

Inter-cultural applications of fertilizer will seldom pay in the North Central States because moisture is so frequently the factor which limits yields. When corn is high priced the use of 50 to 100 pounds of a mixed fertilizer high in nitrogen may be profitably applied when the corn is two to four feet high. This should be applied by hand or with a combined fertilizer distributor and cultivator.



UNFERTILIZED

Compare this view with any of corn grown with V-C Fertilizers.

Fall vs. Spring Plowing

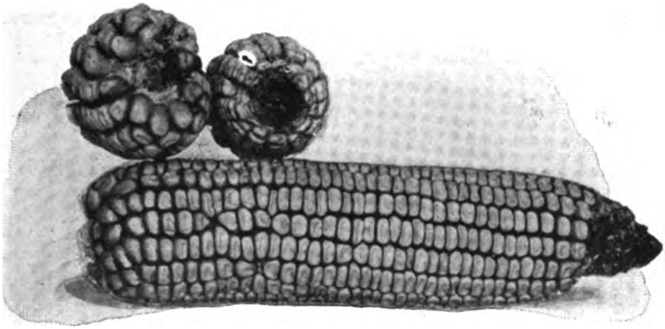
Fall plowing should be practiced for corn where there is a heavy sod to be turned under and the soil does not run together badly. The vegetation turned under will then become partially decayed by corn planting

time and will absorb and retain much moisture during the growing season. The seed bed can also be prepared earlier than when the soil is spring plowed. A heavy growth of vegetation turned under in spring may not decay enough to be of much value to the growing crop until the latter part of the summer and in case of a dry spring may injure moisture conditions.

There is usually nothing to be gained by plowing stalk land for corn in the fall. If the soil does not pack badly wheat and oats stubble may be fall plowed, but if the soil is inclined to puddle after heavy rains it is usually better to plow the land in spring.

FERTILIZED
V-C Fertilized corn on farm of Charles Savage, South Deerfield, Mass.

Corn responds to deep plowing more than most other crops grown in rotations. Soils that have not been previously plowed more than five inches deep should not be plowed eight inches deep at once. The depth of plowing



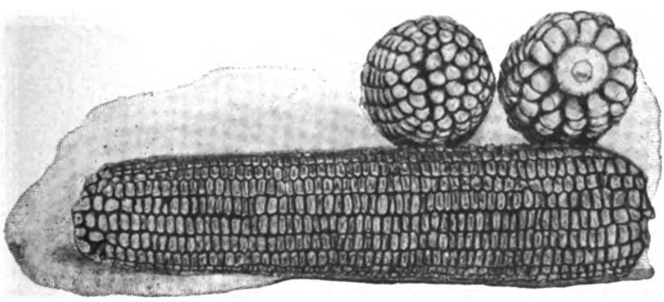
POOR EARS OF CORN

should be gradually increased an inch or so each plowing. This work should be done in fall when the subsoil is reasonably dry and will crumble readily when exposed to the air. In the spring the subsoil is likely to be too wet for increasing the depth of plowing without injurious results.

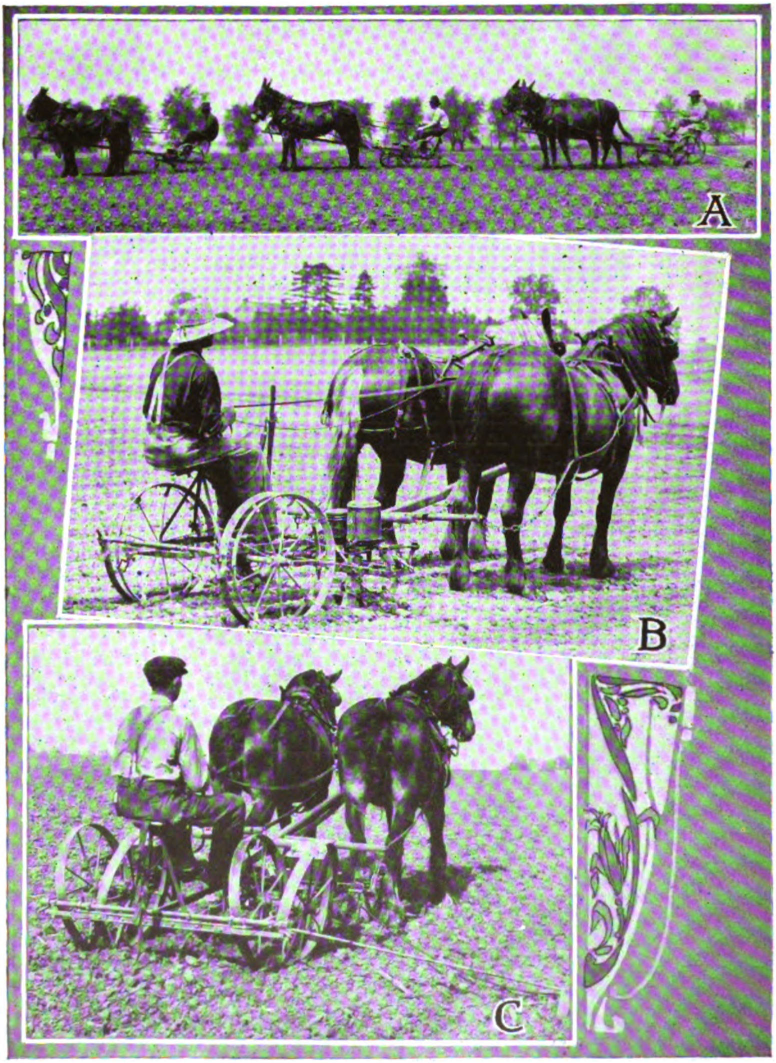
Depth of Plowing

Experiments show that 6 to 8 inches is the most satisfactory depth to plow for corn. In some instances, especially where the soil is kept abundantly supplied with organic matter, it may be advisable to plow the land 8 to 10 inches deep.

Subsoiling is usually not profitable. Soils containing a layer of 4 to 6 inches of very tight clay at a depth of 8 to 12 inches can be subsoiled profitably. Subsoiling is usually done with a narrow plow that is run in the furrow made by the turning plow, which loosens but does not turn the subsoil. Subsoiling frequently improves drainage where the first few inches of the subsoil is very compact. If the subsoil is open and porous, subsoiling will not be profitable.



EXCELLENT EARS
The result of good seed, ample fertilization and proper cultivation.

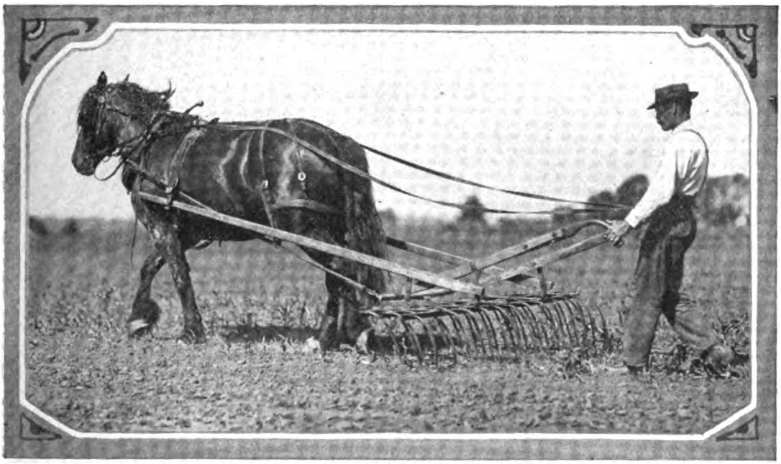


PLANTING SCENES

A-Illinois Corn Belt Farm.
B-Planting corn and soy beans in Southern Indiana.
C-2000 acre corn field in eastern Illinois.

Preparing the Seed Bed

Land which is fall-plowed should not be harrowed until spring. Early spring plowed land need not be harrowed immediately after plowing, but when plowing is delayed until a week or two before planting time the soil should be harrowed immediately after plowing, while still moist. It is then more easily pulverized than when dry. Discing before plowing is frequently advisable if the soil is dry, or much vegetation is to be turned under. Sod land and land which breaks in clods should be well disced two or three times in order to thoroughly fine the seed bed. The preparation



USING A WEEDER

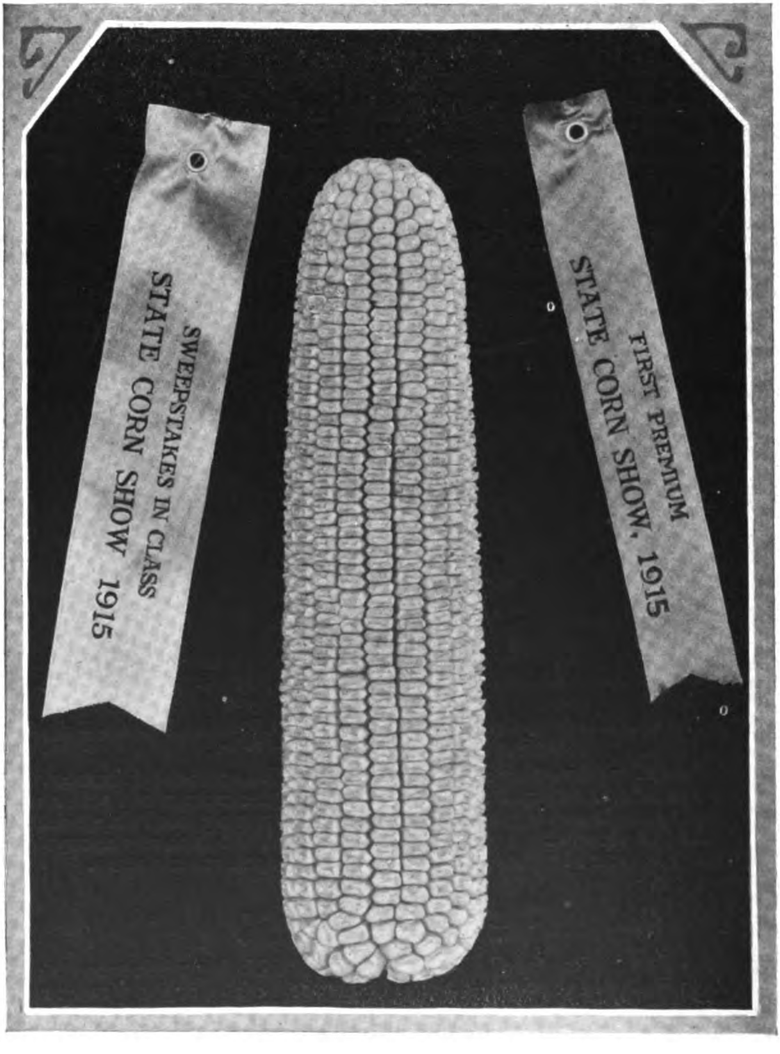
Keeping the weeds down when the plants are young, coupled with liberal fertilization will give the young corn rapid growth and early maturity.

should be finisned by going over once or twice with a spike-tooth harrow.

If the soil is dry and slightly cloddy the plank drag and roller will crush many clods and improve the seed bed. In some cases it is advisable to follow the plow with one of these implements. It is nearly always advisable to harrow shortly thereafter in order to conserve moisture.

Methods of Planting

Corn may be "surface" planted, the seed bed being made smooth and the seed planted in rows 1 to 3 inches below the surface, or the planter may have a furrow opener, usually a pair of disks, which opens a shallow furrow at the bottom of which the seeds are planted. Surface planting is preferable on all heavy soils in regions where the rainfall is plentiful. On the lighter loam soils where the drainage is good the open furrow method is preferable.



AN IDEAL EAR

Sweepstakes in Class, Indiana State Corn show, the delight of the fancier and the pride of the grower. The result of ample fertilization.

NATURAL CORN.
All cultivated corn has been developed from this species.

Corn may be either drilled or checked. In either case a good reliable make of planter should be used. Experiments have shown that drilled corn will produce slightly more than checked when the number of stalks per acre are the same. Drilled corn, however, is more difficult to keep free of weeds, hand-hoeing being sometimes required. Checked corn may be cross-cultivated and for this reason weeds are more easily subdued.

When corn is checked the rows are usually made three and one-half feet each way and two, three or four kernels are dropped in a hill. It is seldom necessary to drop four kernels to the hill when tested seed is used. On very fertile soil three kernels to the hill are sufficient and on less fertile soil two.

When drilled the kernels should be dropped 22 to 24 inches apart on very thin soil, about 20 inches on soil of medium fertility and as close as 12 to 16 inches on fertile soil. There is nothing to be gained by planting corn so thickly that many stalks will not produce an ear.

It is always desirable to grade the seed corn by running it through a grading machine. The planter can then be set to drop the required number of kernels per hill uniformly. A uniform drop can not be obtained with kernels that are irregular in size and shape.

Intertillage

The benefits of interculture may be briefly stated as follows:

1. To kill weeds.
2. To conserve moisture.
3. To aerate the soil.
4. To increase availability of plant food.
5. To reduce run-off of rainfall by keeping the surface loose and porous.

The relative importance of each of these functions vary. Some of them are more important on some soils and in certain sections than in others. Interculture to aerate the soil and release fertility may be important on

heavy soils in a humid region, but negligible on open, porous soils. Where heavy rains come during the growing season it is important to have the soil in a granular condition.

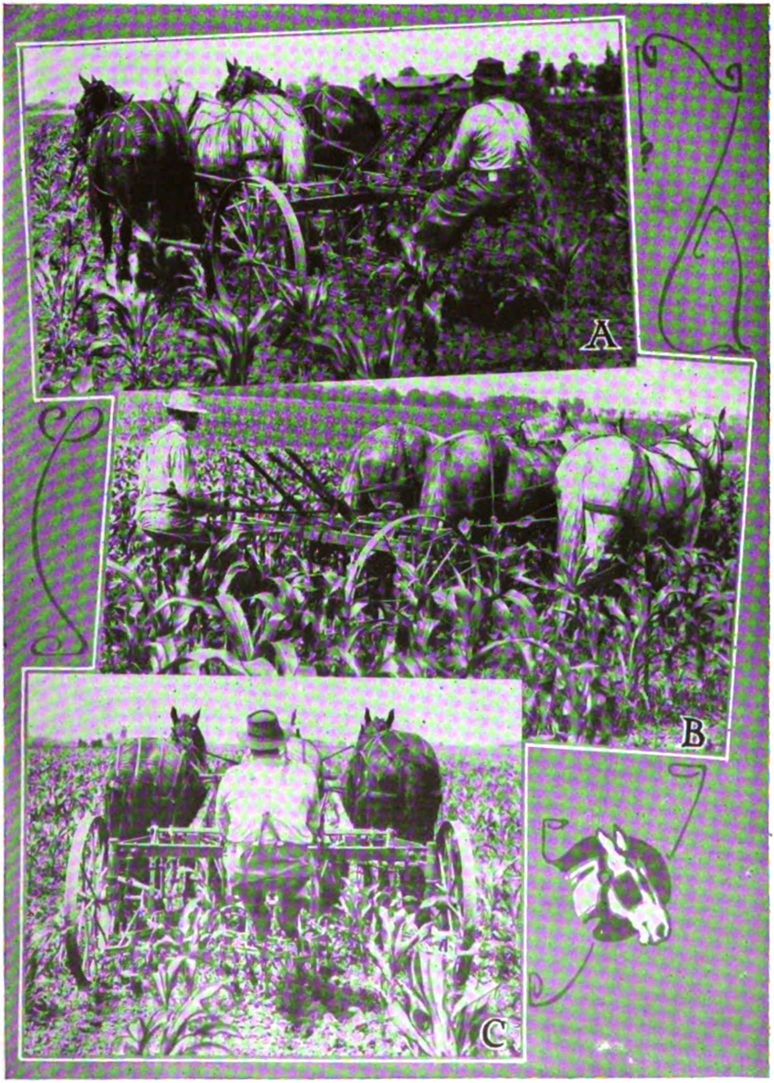
Recent experiments have shown quite conclusively that the main object of tillage is to destroy and prevent weed growth. Where weeds have been kept down by shaving them off corn has yielded 98 per cent. as much as when given the most approved tillage. Weeds use both moisture and plant food, consequently the yield is greatly reduced where weeds are permitted to grow. Two plats of corn were given good cultivation up to June 10 at the New Hampshire Station and after that time one was hand-hoed four times to destroy witch grass, while this was allowed to grow on the other plat. The yield of corn was 81.6 and 61.4 bushels per acre respectively.

MAKING A DUST MULCH
Dragging a discarded motor wheel through corn after the last plowing to make a dust mulch.

Shallow Tillage Best

Numerous experiments prove that shallow interculture is better than deep. No definite rule as to depth can be stated, as deep porous soils may be more deeply intertilled than close heavy soils. Generally speaking, the depth of interculture should range between 1½ and 3½ inches deep.

Cultivation of the corn crop should begin shortly after planting. The field should be gone over just as the young plants begin to show above

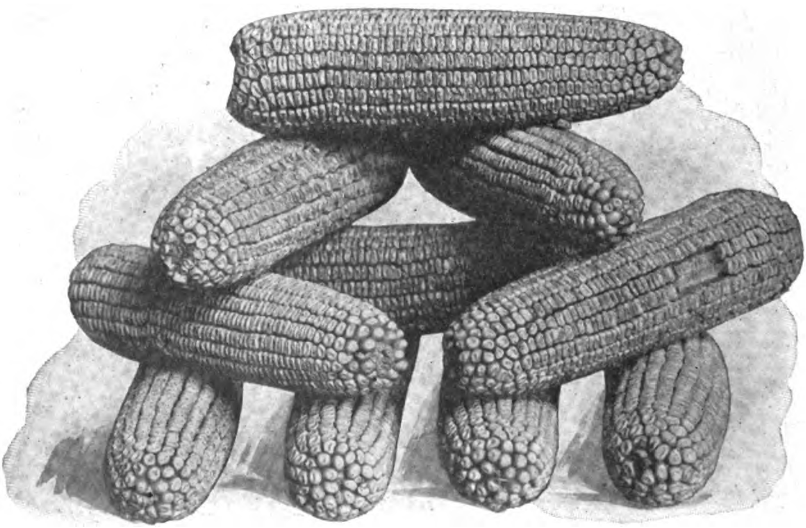


LATE CULTIVATION

Conserving the soil moisture on the Jonesville, Wisconsin, farm of Mr. E. H. Parker, well-known fountain pen manufacturer.

ground, using a weeder on light soil and a spike-tooth harrow on heavy soils. This cultivation will destroy many weeds and make it easier to keep the corn clean thereafter. The next cultivation should be given a week later, using the one or two row cultivator equipped with narrow shovels and finders. At this time the cultivator shovels may be run three inches deep, but all subsequent cultivations should be about two inches deep only. Deep cultivation breaks many roots and should be avoided as it may do more harm than good.

Generally speaking, three to five cultivations will be sufficient. After the first one or two cultivations the cultivator should be equipped with sweep shovels or bars so that as many weeds as possible may be destroyed.



FIRST PRIZE YELLOW DENT CORN.

When the corn is small it may be well to cultivate for the purpose of conserving moisture, but after the corn is a foot high the chief object should be to keep down weeds. Heavy soils will also need to be cultivated occasionally for the purpose of aerating and releasing fertility.

Seed Selection and Storage

The selection of suitable corn for seed is not given as much attention as the importance of the subject demands. Proper attention to this phase of corn production is one of the easiest ways of increasing yields. More than half the seed corn planted is selected from the crib. A uniform lot of ears may be selected from the crib, but there is no way of determining the character of the stalks on which they grew. This is fully as important as

the type of ear. Crib selection is also responsible for much ununiformity in corn.

All seed ears should be selected from the field after the corn is well dented and before the first freeze. The following suggestions should be given careful consideration.

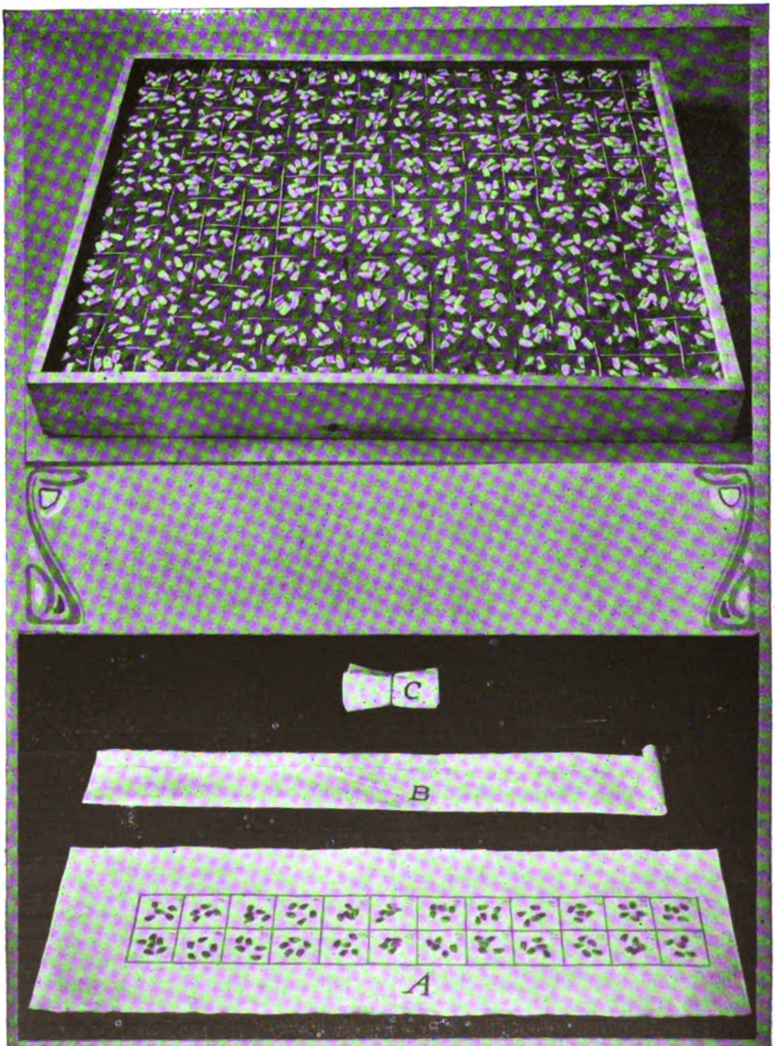
1. Select seed from well-established varieties.
2. Avoid smutted or otherwise diseased plants.
3. Select well-matured ears from stout, erect stalks that are neither excessively large or small and are growing in fair competition with neighbors.
4. Select a uniform lot of well-shaped ears having reasonably straight

ENSILAGE CORN
Harvesting ensilage corn. V-C Fertilizers help fill the silo.

rows of kernels of uniform size, shape and indentation.

5. Select ears borne at medium height on shanks of medium size and just long enough to permit the ear to incline downward slightly.

As soon as the seed ears have been gathered they should be stored in a well ventilated room on racks made especially for the purpose. Several different methods may be followed; the most important point to be observed is to see that no ear is permitted to lie against another. If this is done the air can circulate freely and the ears will soon dry. The drying room should have one or two windows and a door and these should be kept open during drying weather and closed in damp weather. When corn is early selected it will contain 25 to 35 per cent. of moisture and is much injured by freezing. It will not be safe from severe freezes until the moisture content is reduced to about 16 per cent. If it is then kept dry zero weather will not injure it. The use of heat is some times necessary in damp weather. The room should be well ventilated when heat is applied.



SEED TESTING

Upper-Box containing soil with squares marked off; each square contains kernels from separate ear.
Lower-Seed is laid on cloth; the cloth is rolled up and dampened.
Only seeds from ears, the kernels from which germinate quickly, are used.

Testing the Seed

Seed corn which was early field selected, properly dried and stored need not be tested in the germinator. However, the farmer well should know that proper precautions were taken in every step or some of his seed may not be as good as he thinks. When there is any doubt, it should be tested. Every ear used for seed that was not properly stored should be tested in the germination box before being planted. The Ohio Station found on an average of

SHREDDING FODDER CORN
Farm of Mr. William Miller. Mulberry Indiana.

eight years work that the time spent in testing seed corn was paid for at the rate of $6.50 an hour by the increased yield secured when tested seed was planted in comparison with untested seed.

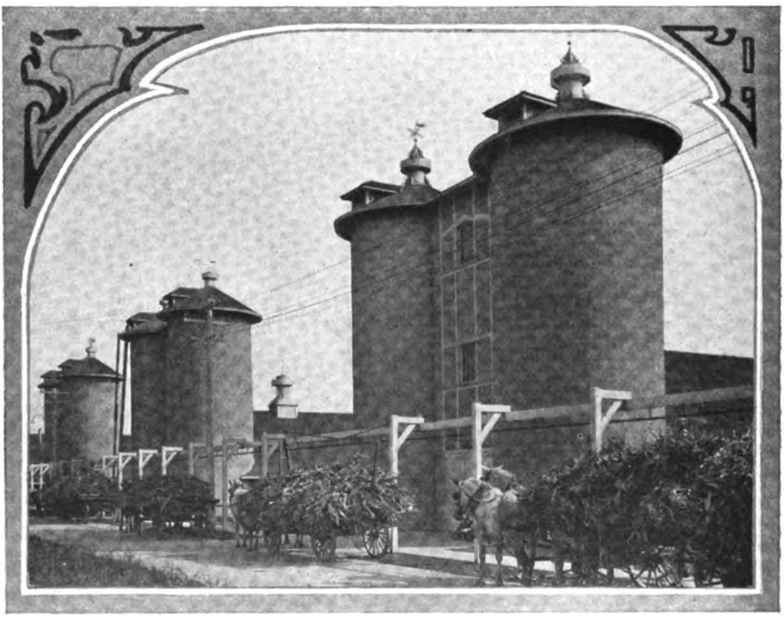
The most satisfactory way of testing seed corn is to germinate 6 to 10 kernels from each ear. It is practically worthless to germinate 100 or more kernels from a lot of shelled corn. If there is any poor seed in the lot it can not be separated from the good. If each ear is tested before it is shelled the bad ones may be thrown out.

There are several makes of seed testers on the market, but satisfactory ones can be made at home. Usually several shallow boxes are made filled with sand or sawdust. Each box should be laid off in two inch squares. These should be numbered from left to right and lettered from top to bottom. The ears to be tested are then arranged in sets of ten or twenty. Each ear should then be taken in order, six grains removed, and these grains placed in the corresponding square in the box. When the box has been filled it should be covered with a cloth and thoroughly wet down. The cloth may remain, or it preferably may be removed and the box covered with glass to prevent the escape of moisture.

The kernels used for making the germination test should be taken from different parts of the ear, only one being taken at a place. These should be placed in one square of the germination box. When the box has been filled it should be kept in a room at a temperature of 70° to 75° F. for 6 to 8 days, or until the young plants are 4 to 6 inches high. No ear should be used for seed that does not give five strong seedlings from six kernels.

Choosing a Variety of Corn

Corn improvement would be greatly advanced if every farmer would select at once a good yielding variety that is adapted to the region. Much



MODERN CONCRETE SILOS
Cleveland City Dairy, Warrensville, Ohio.

scrub corn is still grown and the first step in improvement is to discard it for a well established variety. No one variety will produce equally good results in different regions unless bred or selected to suit the conditions prevailing.

In choosing a variety it is preferable to go not over 100 miles either north or south of the locality in which the corn is to be grown. One may secure seed at a distance either east or west, as such seed is likely to have been accustomed to a similar climate, unless the altitude is either higher or lower than the section for which seed is desired.

In the central and southern parts of the Corn Belt, (Ohio, Indiana, Kentuckey, Missouri, Iowa, Nebraska and Kansas), the following varieties are most extensively grown.

Yellow	**White**
Leaming	Silver Mine
Reid's Yellow Dent	Boone County White
Riley's Favorite	Johnson County White
Early Yellow Dent	St. Charles White
Gold Standard	Anson's White Dent
Gold Mine	Clarage

CULTIVATION EXPERIMENT

The corn to the right was neglected; that on the left was carefully cultivated. Other conditions were the same.

The following varieties are grown more extensively in the northern part of the Corn Belt and further north, (New England, New York, Pennsylvania, Michigan, Wisconsin, Minnesota, North Dakota and South Dakota. Above 1,000 feet elevation, the flints are grown almost exclusively.

Early Dent Varieties	**Flint Varieties**
Pride of the North	King Philip
Early Calico	Smut Nose
White Cap	Eight-row Yellow
Minnesota No. 13	Hall's Gold Nugget
Wisconsin No. 7	
Early Huron	

It should be remembered that varieties having large cobs and deep grains do not mature as early as varieties having medium sized cobs and medium length grains. It is well to select seed that is only moderately rough, with medium size cobs and kernels about one-half inch long. In the northern part of the Corn Belt small cobs and shorter kernels are preferable.

Insect Enemies

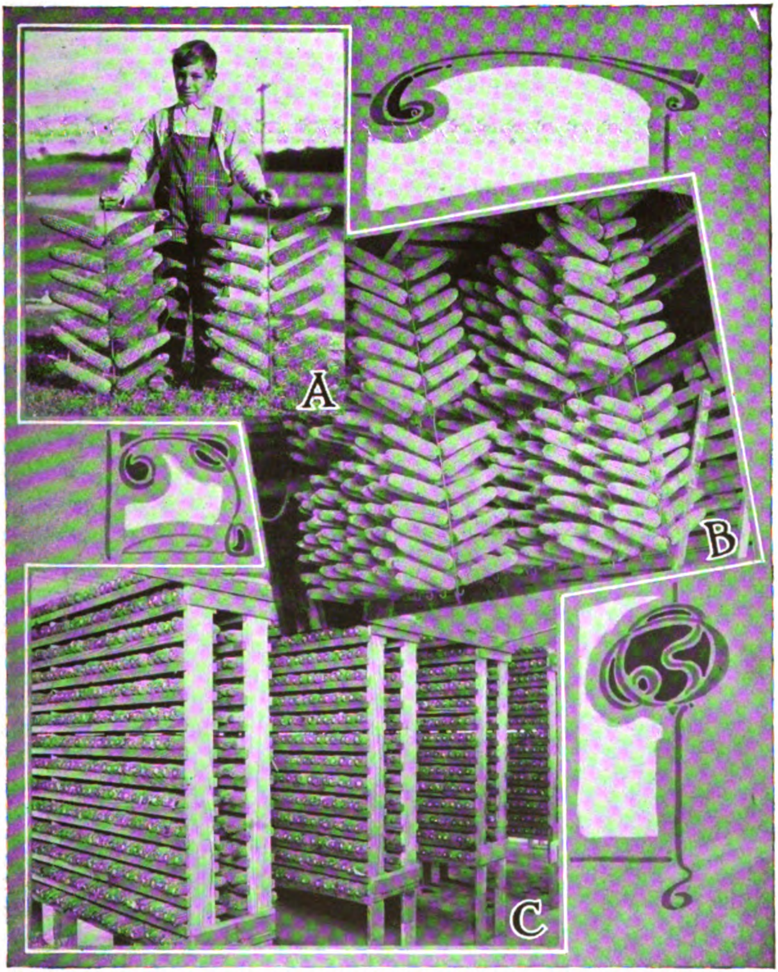
There are several kinds of insects that attack corn in different ways and under varying conditions. The corn root-worm and root-lice both attack corn quite severely at times. These insects usually do their greatest harm on land that has been planted to corn for several years in succession. Two preventive measures may be recommended: First, a rotation of crops will be of great value. Second, the application of fertilizer, especially fertilizer containing potash salts, made in the rows seems to act as a repellent and is very effective in preventing injury from root-lice. Frequent tillage is also recommended as an effective means of control.

SILO FILLING

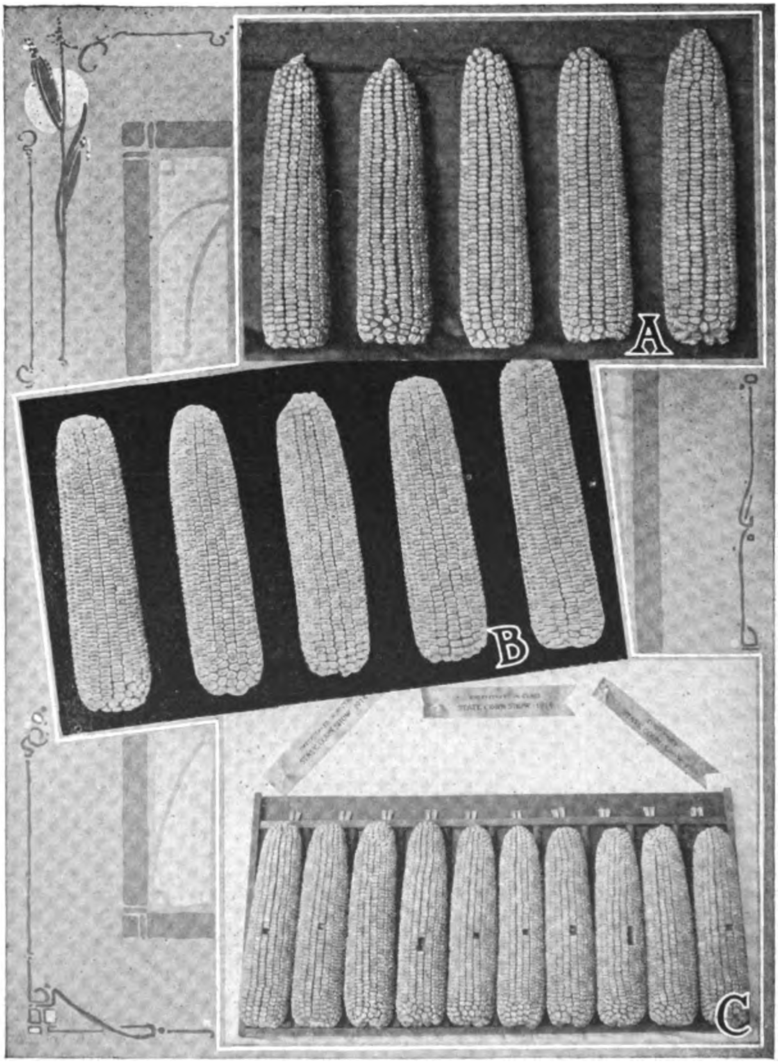
Farm of Carpenter & Ross, Mansfield, Ohio. The auto engine may be connected to the cutter if the gas engine fails

The wire-worm usually does most damage when corn follows a grass sod. The grub-worm and cutworm do most damage to corn following clover sod. Late fall plowing is of considerable value in reducing the number of these insects. No effective method has been found for controlling injury from wire-worms, although drilling fertilizer in the rows has been of some value. Cutworms are poisoned by mixing one pound of Paris green to forty pounds of bran. If the mixture is moistened and then dried the poison will adhere to the bran and it may be drilled. A quart of molasses may be added to the mixture, when it is to be spread on the surface by hand. Fall plowing is the only effective remedy that has been proposed for controlling cutworms.

No effective measures are advocated for the control of other insects attacking corn, except migratory insects, such as chinch bugs and army worms. Effective measures for their control will be given by your state experiment station upon request.



STORING SEED CORN.
A-Young farmer with his seed corn ready for drying.
B-Seed corn as racked for drying by Mr. F. C. Palin, Newtown, Indiana.
C-Seed corn on racks, Purdue University, LaFayette, Indiana.



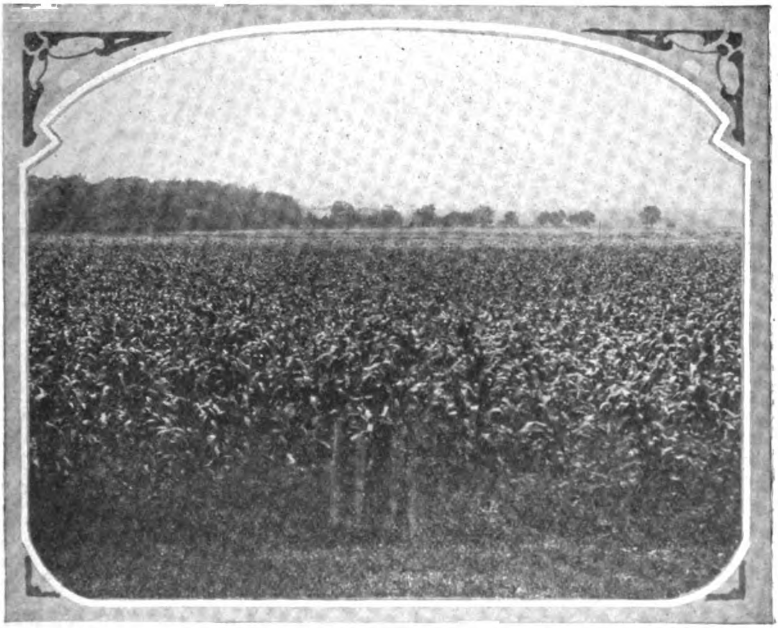
EAR CORN

A. & B.- Good Seed Ears.
C-Sweepstakes in Class, Indiana State Corn Show.
High class show corn is not necessarily the most productive seed. A slightly smoother type is considered more disease resistant.

Silage Production

On most farms the same varieties and methods of culture are used for producing silage corn as field corn. It is generally conceded that a larger tonnage can be produced per acre by planting thicker and also by using special varieties that produce a large amount of foliage. These facts have recently been well established by the Ohio and Indiana experiment stations. However, no feeding tests have been conducted which show that an increased tonnage gives a larger feeding value per acre.

Experiments show that by planting corn too thick the yield of grain is decreased slightly and silage production increased. Planting corn for silage thicker than for grain is doubtless the safest plan to follow on most

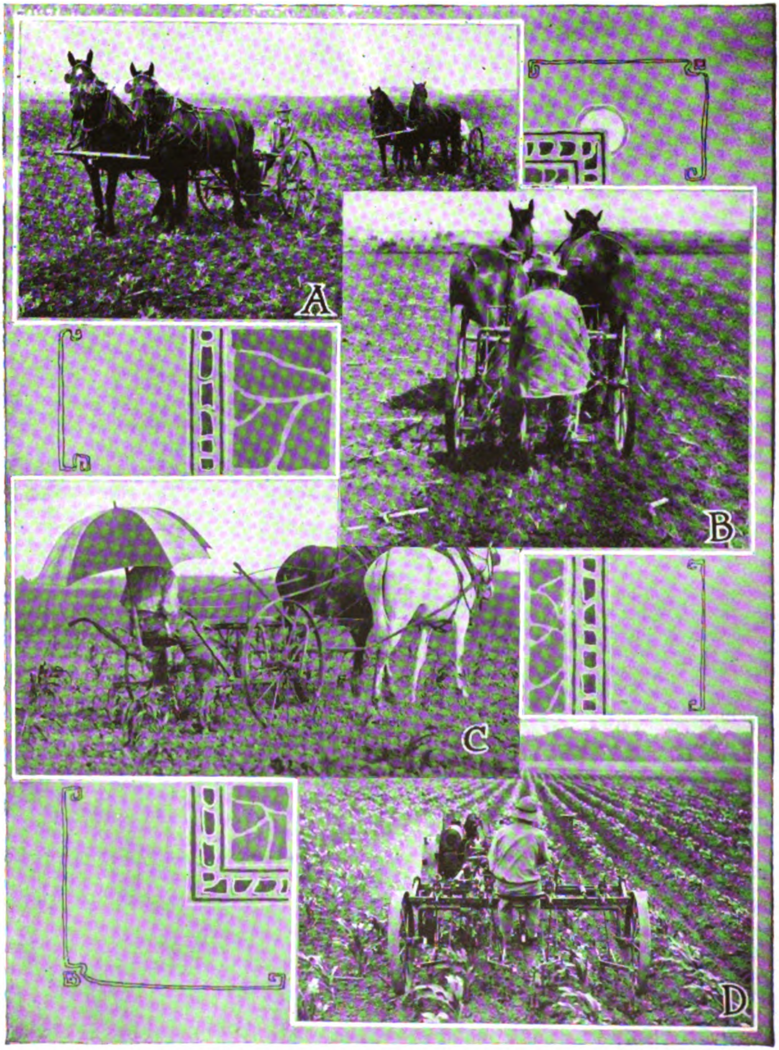


60-DAY OLD CORN

The result of proper application of V-C Fertilizers-increased yield, improved quality, early maturity-thus freeing the land for another crop.

farms. If cows are to be fed it may be advisable to plant varieties especially adapted for silage.

Immature corn makes poor quality silage. The best grade of silage is made from corn that is well dented and fairly well glazed. Silage to be utilized by fattening cattle should be made from corn mature enough to shock. If such corn is finely cut (one-fourth inch long), it will be so much relished that there will be no waste in feeding it. If many of the lower leaves of the plants have dried up a constant stream of water should go into the silo with the corn so there will be sufficient moisture present to preserve the silage properly.



CORN CULTIVATION

A, B & C- Horse Cultivtion.

D-Cultivating 16 acres a day with a tractor.

Harvesting Corn

Many farmers do not believe it profitable to cut and shock corn. If the supply of other forage is sufficient to meet the farm needs and labor is scarce and high-priced, the farmer is fully justified in refusing to cut and shock corn. If he needs the feed, he will show good judgment in cutting and shocking as much as can be profitably utilized.

When corn is cut and shocked it should not be cut until the grain is well glazed and the husks are nearly brown. The usual custom is to shock 12 or more rows together.

Three methods of cutting are in common use: (1) Cutting by hand, (2) using a sled, drawn by one horse, on which two men stand and gather the corn cut by two sharp knives fastened to each side of the sled, and (3) by the corn harvester and binder. Hand cutting is both slow and laborious and should not be practiced except on very small areas in sections where labor is cheap. The sled cutter should be used on all small farms where the area to be cut does not exceed 30 to 40 acres and many farmers maintain that these cutters are more economical for large areas than corn binders. When the sled cutter is used each man rides on the cutter until he gets an armful of corn, when the horse is stopped and the corn carried and placed in the shock. If the corn binder is used the corn must be picked up from the ground and carried to the shock. Corn binders are very expensive machines and their cost per acre of corn cut is very large, unless they are used to cut more than 25 acres per year.

When the corn is a little green and the weather warm it is better to make the shocks half size at first. A few days later when the shocked corn has dried some the shocks may be finished. This precaution will frequently prevent many of the ears on the inside of the shocks from molding. If the corn is well matured it will not be necessary to take this precaution. If the corn grown does not mature in a normal season it may be advisable to secure an earlier variety. The use of a suitable fertilizer also hastens maturity.

Husking and Shredding

Corn will be ready to husk or shred in six to ten weeks after being shocked, depending on its maturity and the kind of weather. It may be husked by hand before it is dry enough to shred, as the ears may dry out some time before the stalks do, especially if the soil is very damp. If the butts of the stalks are green or very damp when shredded the stover will heat and spoil in the mow. For this reason it is important that the stalks be fairly dry when shredded. A slight amount of external moisture on the leaves makes shredding easier.

THE HARVEST

A-Shocked corn, Purdue Farm, LaFayette, Indiana.
B-Corn and pumpkins, Frank Reavey's Farm, Clay City, Indiana.
V-C Fertilizers reduce the amount of soft and unsound corn, besides increasing the yield.

In the Corn Belt most of the corn is husked by hand from the standing stalks. During recent years huskers have been perfected that do excellent work and on large farms corn may be husked by them more cheaply than by hand. About ten horses are required to operate a husker and to haul and house the corn. On short hauls three wagon teams will be required and on longer hauls four or five, depending on the distance the corn must be hauled. Huskers may be jointly owned by three or four small farmers. In sections where the corn acreage is large and labor is scarce such an arrangement is highly desirable.

Sweet Corn

Sweet corn is grown mainly for the family table, nearby town and city markets, and for canning factories. It is sometimes grown for forage and for "hogging down," but not extensively.

EFFECT OF ACID PHOSPHATE ON CORN.
Each shock is the produce of 1-20 acre.
Left-Yield per acre, 42.2 bushels where acid phosphate was applied.
Right-Yield per acre, 29.4 bushels, no acid phosphate applied.

During the past few years it has been difficult for canners to secure sufficient sweet corn to fill their orders. In some instances they have been compelled to mix field corn with the sweet corn in order to supply the demand. In addition to the requirements of the army and navy, people in general are using more canned corn and the prices paid for canning crops are especially attractive.

It offers many advantages to growers who can supply a factory within reasonable distance. The crop fits in the rotation and is not as hard on the

land as field corn; the crop can be contracted at an established price, and can be marketed at a slack time in the season; it provides a money crop before the field corn is mature and will pay a big profit on liberal applications of commercial plant food, thereby reducing the amount of plant food taken from the soil.

Sweet corn is harvested in time to make possible excellent preparation of the land for wheat or rye and these crops will make profitable use of any residue of plant food that may remain from the fertilizer applied to the sweet corn.

For best growth and development, sweet corn requires a well drained, rich, mellow loam soil. Like field corn, it may be grown with fair results on most kinds of soil. It is best to grow sweet corn in rotation as recommended for field corn. It grows best on clover sod and on stubble land that has been well manured.

SWEET CORN
1000 acre field near Hoopeston, Illinois.

Fertilizers for Sweet Corn

Sweet corn grows and matures in a short season and for this reason should be well fertilized, as anything that hastens growth improves the quality. Except on very fertile soil a complete fertilizer should be used. V-C fertilizer containing about 2 per cent. nitrogen, 8 to 12 per cent. phosphoric acid and 2 to 3 per cent. potash should be applied at the rate of 200 to 400 pounds per acre. This should be drilled broadcast before the corn is planted. On cold soils 100 pounds to the acre should be drilled in the rows at planting time, as it will hasten early growth.

Methods of Planting

On farms where weeds are troublesome check-rowing is preferable to drill planting when several acres are grown in a field. Check-rowing makes hand-hoeing unnecessary. On small lots planted for the family or

CORN HARVESTING MACHINERY
Central Illinois Corn Belt.

local market, check-rowing is not necessary. The general practice is to plant in rows 30 to 40 inches wide with hills 24 to 36 inches apart. It is best to drop 4 to 6 kernels per hill and then thin to 3 or 4 strong plants per hill. Cultivation should begin with a weeder or harrow and be continued the same as for field corn.

Varieties of Sweet Corn

For the home garden, quality is of first importance. The custom is to plant one high-class early variety, such as Golden Bantam, every two weeks, or plant an early and a late variety at one time or ten to fifteen days apart. Country Gentleman and Black Mexican are both very desirable for the home or market garden.

Commercial varieties may be divided into three groups, as follows:

Early	Medium Early		Late
Early Maine	Golden Bantam	Honey	Black Mexican
Adams Early	Metropolitan	Crosby	Country Gentleman
Aristocrat	Quincy Market		Stowell Evergreen
Cary			Mammoth Hickox

On account of mixing it is unwise to attempt to grow two or more varieties near each other that mature at the same time. If an early variety is planted first a late variety may be planted nearby about two weeks later without much chance of the two becoming mixed. Sweet corn should never be planted near field corn if the two mature about the same time.

In order to secure good seed of high quality it is advisable for the farmer to select and store his own seed. Best results will be obtained by selecting seed from stalks that bear two and three good size ears per stalk. The ears thus selected should be stored where they will dry out properly before freezing weather. If care is used to prevent the sweet corn from becoming mixed and careful attention is paid to seed selection a variety of high quality may be maintained indefinitely.

"The World's Champion Sweepstakes Best Twenty Ears of Corn"

The following letter written by Mr. Peter J. Lux, the "Corn King," will be of interest to all users of fertilizers. Mr. Lux is very modest in his statement of his winnings. The fact that Mr. Lux's corn was in competition, in the greatest corn show ever held, with 17,000 ears of the best corn

GRAND CHAMPION SWEEP STAKES OF THE WORLD. 1919.

the world could produce shows that his right to the title of "CORN KING" is indisputable. The yield obtained through the excellent method of cultivation and fertilization used by Mr. Lux was 73 bushels per acre:

Shelby, Ind., December 15, 1919.

Virginia-Carolina Chemical ~~Co.,~~ Corp.
Cincinnati, Ohio.

Dear Sirs:

You have no doubt read in the press that I was awarded "the World's Champion Sweepstakes Best 20 Ears of Corn" at the International Show held at Chicago, November 29 to December 6, 1919. With this honor goes

the handsome Silver Cup of the American Manufacturers Association of Products from Corn, the Blue Ribbon and a substantial cash prize.

The twenty prize ears of white corn were selected from a forty-two acre field of as pretty corn as I have ever seen. This field from which clover hay was cut the previous year, was ploughed ten inches deep in March, 1919, was dragged down when the weather permitted, double disced both ways and then dragged again. After this soil preparation 250 pounds per acre of V-C 20 PER CENT ACID PHOSPHATE was applied broadcast with a grain drill. On May 15, 1919, the corn was planted with an application of 100 pounds of V-C 2-11-0 FERTILIZER drilled in the row with the corn. After the corn was big enough it was ploughed five times at proper intervals with a two row cultivator and just before it began to tassel it was again cultivated with a shallow tooth cultivator. It was then left until the first week in October (which is seed picking time) when I selected these wonderful twenty ears.

I have found that by broadcasting 20 per cent as an acid phosphate prior to planting in the manner described and when seeding by putting 2 per cent ammonia with available phosphoric acid in the row, the corn is started quickly and is given a finish that no low grade fertilizer will produce. This method of fertilization also ripens it evenly and gives it the quality and constitution desired by national corn experts.

Each ear of the corn that won this great honor at the International Show is ten and one-half inches long, eight inches in circumference and weighs twenty-one ounces.

Out of this same field I selected one hundred ears of white corn that won for me the Sweepstakes at the Interstate Show held at Bethany, Mo., on the 27th day of November, 1919.

In addition to specializing in Johnson County White Dent, I am also a grower of Reid's Yellow Dent seed corn and took second p ize at the Chicago International Show on the yellow corn, which was cultivated and fertilized by the same method as I have described.

It is needless to say I am highly pleased at my success.

Very truly yours,

PETER J. LUX.

INDEX

Free V-C Crop Books

THE Agricultural Service Bureau of the Virginia-Carolina Chemical Company issues a series of crop books similar to this one, which every farmer or land owner will find full of practical suggestions and information on the growing of the leading farm crops.

Each book covers all the steps in the production of the crop, including Soil Management, Soil Preparation, Selection of Varieties, Planting or Setting, Fertilization, Culture, Pest Control, Harvesting and Marketing. The titles of the books and the crop they cover, are as follows:

1. **Cotton.**
2. ***Corn.**

    Field Corn   Sweet Corn

3. ***Tobacco.**
4. ***Wheat, Oats, Rye, Barley and Rice.**
5. ***Grasses for Hay and Pasture.**

    Grasses   Alfalfa
    Clovers   Cowpeas
    Millets   Soy Beans

6. ***Vegetables and Truck Crops.**

    Asparagus   Egg Plant   Pumpkins
    Beans   Garlic   Radishes
    Beets   Leek   Shallots
    Cabbage   Lettuce   Spinach
    Cantaloupes   Onions   Squash
    Cashaws   Peas   Tomatoes
    Cauliflower   Peppers   Watermelons
    Celery   Potatoes, Irish   Hot Beds
    Cucumbers   Potatoes, Sweet   Cold Frames

7. ***Strawberries and Other Berries.**

    Blackberries   Raspberries
    Dewberries   Strawberries

8. ***Orchards and Good Fruit.**

    Apples   Nectarines
    Apricots   Peaches
    Cherries   Pears
    Grapes   Plums

9. **Citrus Fruits and Truck Crops.**

    Grape Fruit   Oranges
    Lemons   Pineapples
    Subtropical Truck Crops

10. **Peanuts.**
11. **Sorghum and Sugar Cane.**

12. **The Boll Weevil and How to Fight It.**

13. **Making Soils and Crops Pay More.**

A Practical Discussion of Soil and Fertilizer Problems.

14. **Apples.**

15. **Sugar Beets.**

16. **Peaches.**

*Indicates that two editions are available, one adapted to Southern conditions, the other to Northern and Western practice.

If you have any question in regard to the Management of the Soil, or the Growing of Crops, which the books do not answer, write the Bureau, stating your problem, and your letter will be given prompt attention. This service is free.

Agricultural Service Bureau,
Virginia-Carolina Chemical ~~Company~~ Corp,
Richmond, Virginia.

CUT ALONG THIS LINE

V-C CROP BOOK COUPON

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Please send me the Free V-C Crops Books checked in squares below:

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☐ 8. **Orchards**
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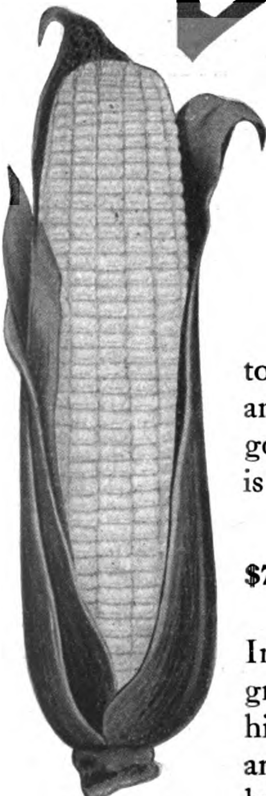
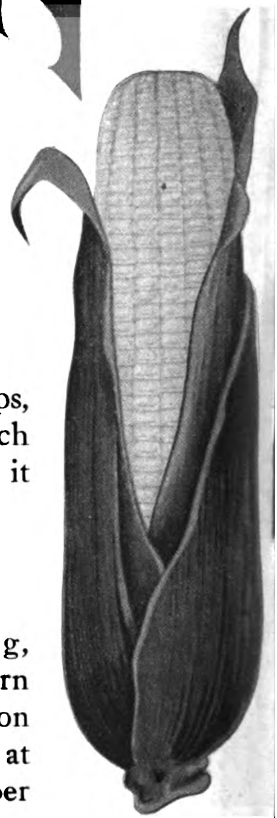
☐ 12. **The Boll Weevil**
☐ 13. **Making Soils and Crop Pay More.**
☐ 14. **Apples**
☐ 15. **Sugar Beets**
☐ 16. **Peaches**

Name ______________________________

Address ______________________________

CORN





Experience of Daniel T. Wells, Riverhead, N. Y.

If any one doubts that V-C Fertilizers help to make bigger and better crops, follow the example of Daniel T. Wells, Riverhead, N. Y. He used 15 tons of V-C on his various crops, and says the goods were in such good drilling condition that it is a pleasure to use V-C.

$7.00 Per Bushel for Corn.

Ed. Short, Greensburg, Indiana, a prominent seed corn grower, used V-C Fertilizers on his corn, and sold the corn at an average price of $7.00 per bushel.

FOR SALE BY

COTTON

Published by

VIRGINIA-CAROLINA CHEMICAL CO

RICHMOND, VIRGINIA

Cotton

Published By

CROP BOOK DEPARTMENT

VIRGINIA CAROLINA V-C Fertilizers CHEMICAL CORP. RICHMOND, VA.

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AND
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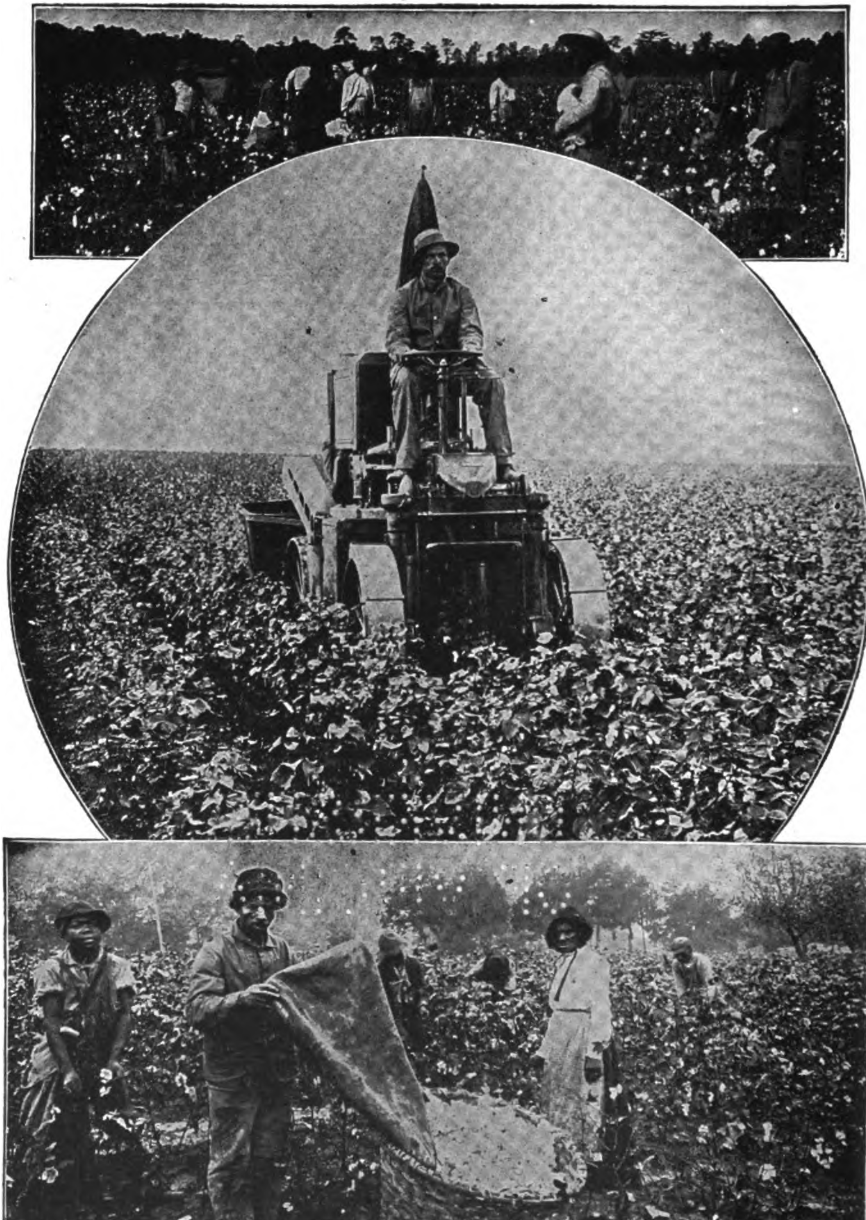


The Mechanical Cotton-Harvester is a wonderful machine which is claimed to discriminate between ripe and unripe Cotton-bolls, finger over the delicate plant, get the lint and leave the rest unharmed, with almost human intelligence. Thousands of progressive planters use V-C Fertilizers for growing their Cotton and are always assured of bountiful crops.

INDEX

Cotton

Wonderful Cotton Future:

Every planter should know this remarkable fact: that while all the world can grow corn and wheat and grain of various kinds, upon 12 Southern States of the United States the world is dependent for fully 75 per cent of its cotton supply. The uses to which cotton may be put are greatly increasing, the population of the world is growing greater, there are more people each year to use cotton and articles made of cotton. In other words the world's demand for cotton each year is bound to increase. It is generally known that the area in the South that can be devoted to the culture of cotton is great; not one-tenth of it has yet been planted to this crop. But it is extremely doubtful if the acreage planted to cotton can be increased in the same proportion that the demand for the staple is increasing.

A Dependable Crop:

Few crops are so dependent upon commercial Fertilizers as cotton, and the functions of the fertilizing elements are very marked.

Phosphoric acid is of the highest necessity in cotton production. While this element is necessary to the growth of every part of the cotton plant, it is particularly important for seed development directly and for lint indirectly, since the seed must be healthy and abundant to make a fair yield of lint. Phosphoric acid is more important than nitrogen and potash. Phosphorous hastens the maturity of the crop, inducing a healthy and early opening of the bolls.

A Cotton Crop that almost hides men and mules. 35 acres of this on which 1000 lbs. of V-C Fertilizers per acre were used, resulting in a yield of 2 Bales per acre. This view is made of Mr. W. A. Deal's field of Cotton near Angier, N. C., showing Mr. Deal in foreground and his two sons, Harvey and Alfred, on the fiery steeds in background.

Nitrogen gives the cotton plant an abundance of well-developed and healthy leaves, and the leaves are necessary to the development of the seeds and other parts of the plant. Nitrogen is also necessary to the development of the high per cent of nitrogen contained in the seed, as well as the large quantity in the leaves.

Potash gives constitution and vigor to the cotton plant, helps to build stalk, stem and bur, and enables the plant to resist rust, and this aids in the development of a full crop of healthy bolls.

A splendid yield of Cotton is here in sight on the Plantation of Mr. L. W. Henry, near Rodman, S. C., who used 600 lbs. of V-C to the acre to produce this gratifying result.

Fertilizers for Cotton

A Profitable Responder to Fertilization:

There are no crops produced anywhere in the world that respond so profitably to fertilization as do cotton and tobacco, and the vast amount of accumulated data, secured through Fertilizer tests with these crops, is the basis of a great proportion of our knowledge of the use of Fertilizer for not only cotton and tobacco, but for other crops as well. It was under cotton that Fertilizers were first used in the South, and it is under cotton that the major portion of the Fertilizers, annually costing millions, are now used. In the early years of cotton growing in the South there was a vast area of new land—virgin soil—with plant food accumulated through centuries.

Soil Mined to the Limit:

In these early days fields were soon worn out and new ones cleared. These, in turn, also became worn out and the clearing continued, until finally there was but little left to be cleared. The farmers abandoned their old farms and moved West, to conquer other new areas of virgin land. Their children, in turn, wore these lands out, and the tide of emigration continued still further westward, until the Pacific Coast was reached. Rich, virgin lands in every cotton-producing State have in times past been considered inexhaustible. Thousands of acres in the rich Black Belt of Alabama, the Prairie and Delta regions of Mississippi the Prairie and River Bottom lands of Arkansas and Louisiana and many areas of Texas and Oklahoma once produced cotton in such prodigal abundance that the harvest continued into January and February.

An interesting test made by Mr. James M. Swint, of Chipley, Ga., on a plot of land which has been cleared for over 50 years. On the test row in center *no* Fertilizer was applied, producing 11 lbs. for a given distance. First row on right made 33 lbs., same distance, difference, 22 lbs., or equal to 3 to 1. Nothing used but 500 lbs. of V-C Fertilizers.

Modern Methods Applied:

Naturally a large proportion of these once so rich lands are now so reduced in fertility as to require the adoption of modern methods for their profitable cultivation, and the use of commercial Fertilizers is the means by which these once fertile lands are again being brought to a condition of fertility greater than they

possessed when fresh from the prairie soil or fresh from the forest. Fertilizers have been the means of enabling many thousands of farmers to produce cotton profitably on soil that has become worn out, and has been the main element responsible for the restoration of many thousands of acres of once worn out lands to a fertility greater than they possessed when fresh from the forest or when first reclaimed from the prairie.

Mind the Other Things:

Very few acres of cotton are to-day planted without commercial Fertilizers, and only a very small proportion of these few acres are cultivated at a profit. It has been proven that it does not pay to grow cotton if good commercial Fertilizers are not used. Few cotton farmers would continue to grow cotton if they could not get Fertilizers; yet, there is no doubt but that many farmers do not get the profit from their cotton crops that they are entitled to, simply because they do not properly and efficiently do other things necessary to a good yield of cotton. It is safe to say that double the returns from the use of commercial Fertilizers would be secured if the cotton farmer would wisely give full credit to these other things he must do and if he would not expect too much of commercial Fertilizers alone. The cotton farmer might use the best and most properly-balanced Fertilizer ever made, and use it liberally, but if he did not use good seed of a good variety, his profits would be disappointing. If he does not rotate his crops, fertilizers cannot fully make up for the damage done by the lack of rotation; if the farmer does not prepare his land well, his Fertilizers cannot act well; if he does not cultivate well, the water that should dissolve the Fertilizer and feed the cotton will evaporate into the air, and weeds will consume the Fertilizer.

A fine Cotton field of Mr. Frank McNeill, near Raleigh, N. C. Yield 1½ Bales per Acre as the result of using only V-C Fertilizers.

Five Important Points:

Since there are several farm operations involved in the use of commercial Fertilizers, and since each of these several are equally as important as the Fertilizers themselves (since the good effects of Fertilizers depend upon these operations), it is deemed advisable to divide the subject of Fertilizers for cotton into:

1—Good Seed.
2—Rotation.
3—Deep and Thorough Preparation.
4—Appropriate, Timely and Liberal Use of **Fertilizers.**
5—Frequent Shallow Cultivation.

The importance and value of good seed, rotation and good tillage is of universal application in the entire field of agriculture, but they also have a direct and controlling influence upon the good the farmer should expect from the proper employment of Fertilizers for profit in the growing of cotton.

A Bountiful Cotton Crop on the Farm of Mr. W. A. Myatt, near Raleigh, N. C., which gave a yield of 1½ Bales to the acre, as a result of feeding Soil and Crop with V-C Fertilizers.

SEE 8 VIEWS ON OPPOSITE PAGE GROUP

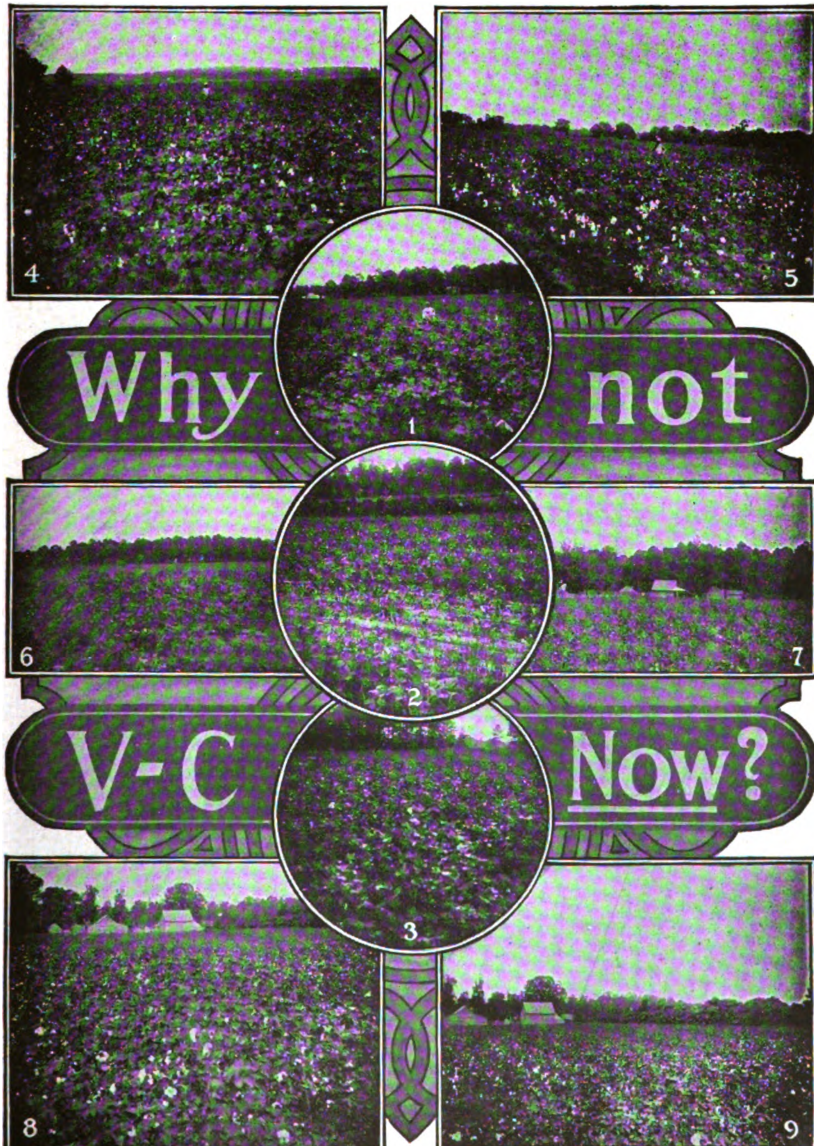
1, 4. 5 and 6—Views of Bumper V-C Cotton Crop on Mr. Peter C. Brunson's Farm near Orangeburg, S. C. Mr. Brunson is 6 feet 1 inch tall and is shown in View No. 1.

2—A view of a miserable Cotton patch near Mr. Brunson's Farm on which V-C Fertilizers were *not* used.

3—A fine Cotton Crop on Mr. Preston B. Sander's Farm near Cordova, S. C., on which only V-C Fertilizers were used.

7—Cotton Crop on Farm of Mr. I. S. Shumaker, near Elloree. S. C., one of the Progressive Farmers of the South who used V-C Fertilizers only on this fine Crop.

8 and 9—Two views on the Farm of another Progressive Farmer, Mr. H. K. Snell, near Elloree, S. C., who is also an enthusiastic V-C user.



All V-C Fertilizer Cotton fields except No. 2 in center, see opposite page 8 for fuller particulars.

Good Seed Cotton

1000 Kinds:

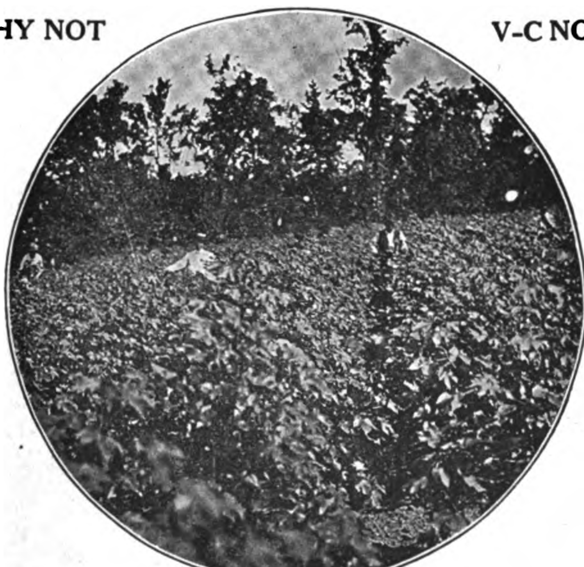
At no time in the past has the farming population so thoroughly appreciated the value of good seed, yet it is, nevertheless and unfortunately, true that many farmers have but a vague and inadequate idea of the full meaning of good seed. There are more than a thousand varieties of cotton, and they vary in their ability to produce profitable yields as widely as the breeds of horses vary in speed, or cows vary in milk production. In a test, conducted by the South Carolina Experiment Station with forty-six varieties of cotton, one gave a yield of lint and seed worth $110.00 per acre, and another a yield of lint and seed worth only $38.00 per acre. These two varieties were grown on the same kind of land, and land that has been treated alike for a number of years; they were cultivated alike and given the same amount and same value of commercial Fertilizer—about 700 pounds per acre. There was no difference in soil, cultivation or fertilization. The difference was in the seed—in the variety. The one barely paying for its production and the other giving an acre profit of $72.00. The failure of the poor variety was not due to the soil, the culture, or the Fertilizer—but to a poor variety of seed.

Dr. Wellborn, of Arlington, Tenn., planted this patch of Cotton May 26th, photographed August 9th. Made 1400 lbs. Seed Cotton per acre. Adjoining field not fertilized and is estimated to produce only 400 to 500 lbs. of Seed Cotton per acre. Use V-C Fertilizers if you want the best yield of the best Cotton.

How to Secure the Best Seed:

One of the most important elements of profitable cotton production is the variety, and there is no excuse for growing a poor variety when there are so many good ones within the reach of every cotton grower. It is not always an easy matter for the individual cotton grower to at once be able to select a good variety for his own soil and manner of culture, but a postal card directed to the Experiment Station of the State in which the farmer resides will bring him a prompt reply and most probably the names of several good varieties known to produce well on that particular area. Each cotton grower should first use every effort to secure one of the best varieties adapted to his environment, and then, by systematic selection, breed up a strain superior to the original and especially suited to his environment. This will not only give profitable returns for the little care and time necessary for this home improvement of a variety, but will also give an opportunity for the sale of planting seed at a price from two to four times greater than the open market price of cotton seed.

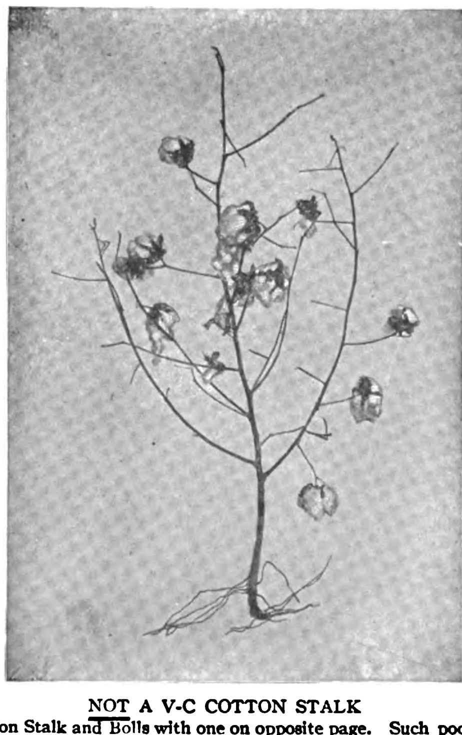
WHY NOT V-C NOW?



The kind of Cotton grown on a 400-acre field on Farm of Mr. Robert R. Haffner, near Chester, S. C. Photo taken August 17th, when Cotton was 5 feet high and heavily fruited. V-C Fertilizers were used entirely.

The Best Pays Best:

Usually it is a poor practice for a cotton farmer to send off for seed of a variety grown in a soil or climate that differs from his own. A variety becomes accustomed to a given environment and often will not do well when changed to a new environment. It should be remembered that it costs just as much to prepare the land, plant, fertilize and cultivate for a poor variety as it costs for a good one, and that all the labor and expense given in the production of a poor variety may cost more than the crop makes. This failure to secure a profit on account of the variety being a poor one is often overlooked, and some even are inclined to charge the failure to the Fertilizer used. No cotton grower should be satisfied until he has secured the best variety.



NOT A V-C COTTON STALK

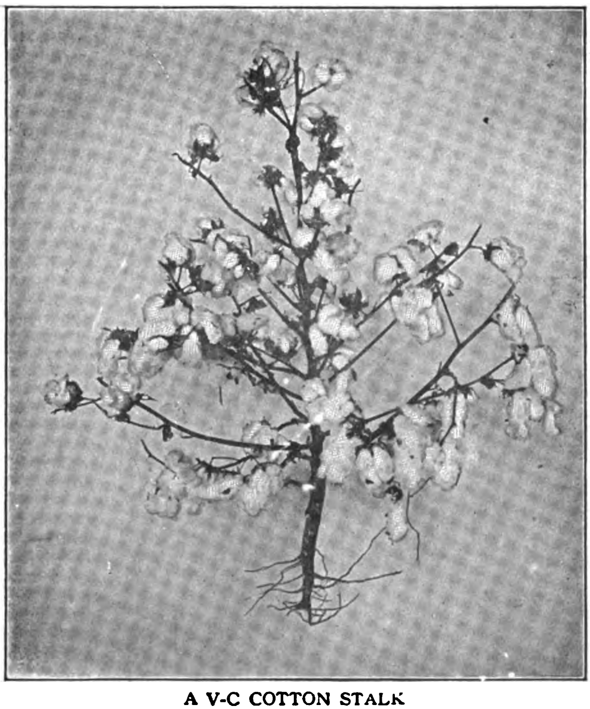
Compare this Cotton Stalk and Bolls with one on opposite page. Such poor results as shown above are impossible when V-C Fertilizers are applied abundantly and wisely. V-C is also a permanent Soil builder.

Rotation

Trouble Ahead:

Crops that are grown on the same land year after year will eventually bring about conditions that injuriously affect the land several ways. They are liable to cause a dangerous increase in the insect pests that attack the crop, and a disastrous multiplication of the bacterial and fungus diseases that would destroy it. Lack of rotation will cause a multiplication of weeds and a depletion of the plant food elements in greatest demand by the particular crop, and wasteful accumulation of the plant food elements in least demand by the crop.

A great variety of crops are grown in the cotton States, and the most approved rotations for one locality may be inappropriate



A V-C COTTON STALK

Not alone a Good Stalk, but also Good Cotton and an abundance of Cotton. This was grown with the use of V-C Fertilizers at the right time and in abundance. Hence, Why Not V-C Now? *You* can do the same as others have done.

in another. The most profitable crop a farmer can grow is that crop which brings the greatest net profit and at the same time exhausts the fertility of the land the least. The cotton growers have lost heavily in soil fertility and in profit from crops through their ruinous practice of growing continuously on the same land the same crop. This is particularly true of cotton.

Variety of Crop Requirements:

Some crops require an excess of phosphoric acid, like cotton; some an excess of nitrogen like corn, small grain, truck, etc.; some an excess of potash, like tobacco and root crops. Some crops occupy the land but a few months in the early spring; some occupy it from fall through the next spring; others from early or late spring to late summer or fall. Some crops occupy the land one, two or more years as annuals, biennials and perennials. Some crops are tap-rooted and some fibrous-rooted. Some crops are cultivated broadcast and some in drills or rows. Some completely cover the ground and some only partly cover it.

Crippled Soil:

Some plants gather nitrogen from the air and leave it in the soil, and some take large quantities of this valuable element of

What a Cotton Crop looks like when V-C Fertilizers are *not* used. See the barren patches, poor stand and stunted growth. This tract adjoins the farm of Mr. Robt. R. Haffner shown in view on opposite page. Both fields photographed at same time.

plant food from the soil. If a given crop (or more than one crop, of the same requirements and nature), is grown on the same land year after year there is danger of direct injury to the soil and danger of the exhaustion of some plant foods and the undue accumulation of others. An unbalanced condition is the result, and the unobservant farmer may say that his land is wearing out. As a matter of fact it is not wearing out; it is crippled, it is sick, it is abused. It needs a rest from the one crop it has supported so long, and a rest by growing another crop of a different habit of growth and a different plant food demand. If a man has eaten nothing but meat for several days, he will feel unwell and may suffer from ill health. If he eats nothing but fruit, he suffers, and needs a balanced food to supply the demands of his body.

Various Rotations:

Of the very many crops grown in association with cotton, various rotative systems may easily be worked out and put into profitable practice on any farm in any section where cotton is grown. In the development of a cropping system there are several things to be considered in the selection of each crop to be used:

1. Each crop must be adapted to both soil and climate.

View on 400-acre field of Cotton growing on farm of Mr. Robt. R. Haffner, near Chester, S.C. Photo taken in August, 1915. Yield of this field was a bale to the acre. V-C Fertilizers were bountifully applied to this field.

2. Each crop should be one that may be profitably disposed of by sale or profitably consumed on the farm.

3. Hoed crops, like cotton, corn, tobacco, etc., should rotate with broadcast crops, like small grain, clovers, etc., and both broadcast and hoed leguminous crops should at intervals be grown on each field of every farm.

4. If one crop takes out of the soil one fertilizing element in an undue proportion to the others, it should be followed by a crop that demands a small quantity of the element removed by the preceding crop.

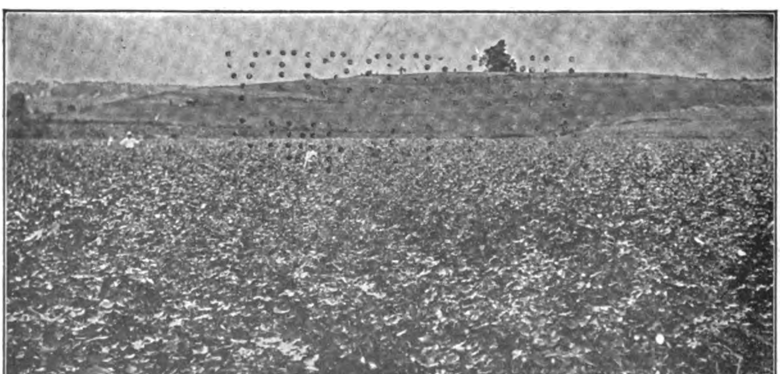
5. Legumes should precede or follow crops demanding large quantities of nitrogen.

6. Crops preyed upon by insects or plant diseases, should not follow other crops preyed upon by the same insects or diseases.

7. The grouping together of crops into a rotative system should be so done as to distribute the labor throughout the year and avoid having too much work at one period of the year and not enough at another period.

8. If the crops grown are to be sold, due consideration should be given the probable over-production or undue scarcity of these crops, and the area given them regulated accordingly.

9. On many of the cotton and tobacco farms the number of live stock maintained is too small to permit of the profitable growing of some of the best rotative crops. More live stock should be kept.



50 acres of Cotton yielding more than a bale to the acre on the Farm of Mr. Jno. Frazier, near Chester, S. C., who used 800 lbs. of V-C per acre. The hill in distance contains about 15 acres which five years ago was washed away with gulleys, but Mr. Frazier reclaimed it by proper cultivation, rotation of grain crops and a liberal use of V-C Fertilizers.

10. With hoed crops, like cotton and tobacco, the most serious obstacle in the way of good farming in the way of profitable returns from the use of commercial Fertilizers and in the way of satisfactory performance of the functions of farming is the absence of humus in the soil. Humus is the life of a soil, it gives the soil its good physical properties. Humus gives the soil its power to absorb rain water and its power to hold water and give it up to the crop.

Humus is necessary to the action of beneficial bacteria. Humus permits the air to penetrate the soil and to sweeten and strengthen it. Humus prevents the formation of a surface crust on the soil and the formation of a hardpan beneath the soil, it keeps the soil deep, open, loose, porous and easily penetrated by

A good Cotton field on Mr. R. B. Faison's Farm, Emporia, Va., on which V-C Fertilizers were used, hence a Bale to the acre.

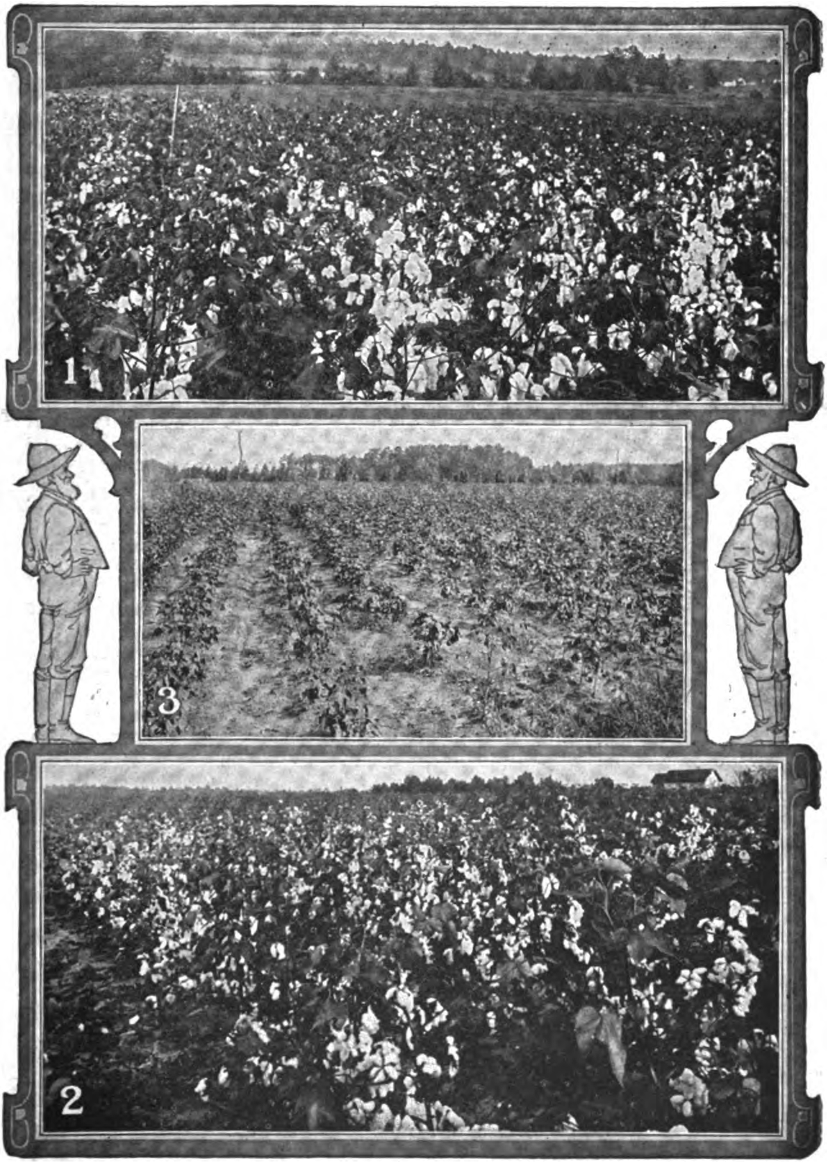
the roots of plants. Humus enables the turnplow, the disc, the harrow and the cultivator to do better work and in a shorter space of time and at more appropriate times. Humus helps to develop a good seed-bed and promotes quick, regular and strong germination of seeds. Humus supplies plant foods and permits of the more economic and more profitable use of V-C High-Grade Fertilizers. Humus, in abundance, in any soil will, with the aid of good commercial Fertilizers make that soil a profitably fertile one, and permits of the use of a maximum quantity of Fertilizers, and the two together will give a maximum profit from any soil and from any crop.

A Great Conservator:

Rotation, where cotton is an important crop, is the most economical means by which humus may be added to the soil. An adequate quantity of humus in the soil will double the profit from good commercial Fertilizers, if they are wisely applied, and is necessary to the profitable production of all of the crops of greatest importance and value in a rotative system with cotton. If the cotton growers will adopt one of the best systems of rotation for their farms, and use wisely increased quantities of V-C High-Grade Fertilizers, double the quantity of cotton now produced per acre will be grown, and at double the profit.

V–C PRIZE COTTON

This excellent stalk of Cotton was taken from Mr. J. Gid Morris' prize acre on his Farm, "Belmont," 14 miles north of Atlanta, Ga. This acre produced 3654 lbs. of Seed Cotton, V-C Fertilizers being used exclusively to produce this result. V-C Fertilizers can do for you what they have done for Mr. Morris.



On field shown in View No. 3 V-C was *not* used. On fields shown in Nos. 1 and 2, V-C was bountifully applied on the farm of Mr. J. Gid Morris of Smyrna, Ga., who is an enthusiastic believer in V-C Fertilizers for growing bumper crops. See his fine Cotton Stalk on page 18. *You* can do the same.

Rotation is the quickest, surest and cheapest means by which humus may be added to the soil, and humus is necessary to the most profitable employment of commercial Fertilizers for the production of cotton and other crops as well. Humus defies the drought and tempers the flood, and is the greatest conservator to soil fertility.

Deep and Thorough Breaking

Make Shallow Soils Deep Soils:

It may almost be laid down as a rule that the fertility of a soil is proportionate to its depth. A shallow soil is a poor soil. A shallow soil has not the capacity for fertility. A shallow soil will lose its fertility, if it has any, very quickly. A shallow soil can neither take up nor hold any considerable quantity of water and quickly loses the little it has. A shallow soil limits the amount of plant food it can hold and limits the feeding area of the roots of crops. A shallow soil cannot produce much humus-making material nor can it hold much humus, but loses quickly that which it has. A shallow soil forces the crop to feed year after year in a limited area and hastens the exhaustion of the plant food. A shallow soil is the soil that will most easily gully or wash away.

A Big Man and a Big Crop. View in Cotton field of Mr. Preston B. Sanders, near Cordova, S. C. V-C Fertilizers were used entirely.

400 lbs. of V-C Fertilizers per acre were used on this field of Cotton on Mr. Daniel Ruffin's Farm, near Raleigh, N. C. This photo was made September 2, 1915. Will give a yield of a good Bale per acre.

Give the Soil a Chance:

So long as a soil is shallow the practices of good farming cannot be used on it, since it is deficient in moisture, deficient in humus, deficient in volume, deficient in physical properties and is not in a condition to enable a crop growing on it to profitably utilize the commercial Fertilizers that may be given it.

All of these deficiences of a shallow soil are due to the fact that it is shallow; consequently, these deficiences may easily and simply be removed merely by changing it from a shallow to a deep soil. Why the average farmer of the cotton area will, year after year, try to grow a good crop on a shallow soil is difficult to explain. It is so evident that a soil prepared eight inches deep is twice as productive as one prepared only four inches deep, that it is surprising that so many earnest and otherwise sensible men will neglect the opportunity of so simply doubling their profits by such easy means. The soil will do its part if it is given the opportunity.

Controlling Factors:

Water, humus and commercial fertilizers measure the amount of cotton that an acre will produce, and the depth of the prepared soil controls the amounts of water and humus it will contain, while the depth of soil and the amounts of humus and water in it controls the action of the commercial Fertilizers that may be applied, and all of these control the yield of cotton and the profit it will bring. A soil eight inches deep will easily

produce twice as much as it would produce if only half so deep. If eight inches deep it can hold twice as much water and twice as much humus and hold them longer and keep them in better condition. The same is true as regards the Fertilizers it will hold. Further, since the deeper soil not only holds more humus, water and Fertilizer, but keeps them better, the quantity ot these essentials in a deep soil would give a greatly increased yield at a greatly decreased cost, or the quantities of Fertilizers applied may be doubled and more than doubled. Far more than double the yield can be secured from an eight-inch than from a four-inch soil.

Photo taken August 11th. Cotton 5½ feet high, 5 feet wide and 4 feet thick. Man with outstretched arms can barely reach outer branches of stalk. This Cotton field is on one of Mr. R. L. Smith's three Farms near Greenville, N. C., and he uses V-C Fertilizers exclusively.

Tickling the Soil:

A deeply broken and throughly pulverized soil with an abundance of humus, is the best assurance against drought and flood, heat and cold. It keeps the soil warmer in winter and cooler in summer, more moist in drought and drier when excessive rains come. The deep pulverization of the soil is one act which produces a number of good results. Many of the supposedly worn-out fields of the cotton territory cover an inexhaustible fertility easily within the reach of the wise and thoughtful grower. He has only to go down after it and loosen it and feed it humus and Fertilizers to make it laugh forth an abundant harvest.

The proper preparation of the land is essential if the full benefit of V-C Fertilizers is desired. Good preparation and cultivation is as important as good fertilization.

Break Thoroughly:

The breaking of land for cotton is often delayed so long that it is done when everything is in a rush and the breaking is most poorly done. Too many farmers do not really break their soil, but merely bed the unbroken soil. Good preparation cannot be obtained by such means. The bedding is more expensive than breaking and too often is done when the soil is wet in the late winter or early spring. It is an exceptional fall and winter, where cotton is grown, that does not give ample conditions and opportunity for breaking thoroughly and deeply early enough that freezing may aid in the crumbling of the soil and bringing it to that degree of fineness necessary to the highest fertility. When fall- or winter-plowed, the soil may not only be deepened or subsoiled and brought to a condition which will enable it to take up and hold more water, but it is in a good seed-bed condition and the preparation for planting is much simplified and may be done better and in a much shorter time, and with greater assurance of being able to plant at the best time for planting and of having a good and prompt stand of strong and vigorous plants.

Level Culture Best:

When the land intended for cotton has been well broken in the fall or in the winter it is not only in good condition for planting, but in good condition for the use of labor-saving implements for putting down the Fertilizer, planting the seed and giving the

best early cultivation. Cotton planters all over the South are abandoning the high-bed system that should have passed out long years ago. The practice of level culture in growing cotton is so rapidly taking the place of the ridge or bed-method as to admit of the use of many labor-saving implements that cannot be used to advantage in bedded cotton fields.

Labor Saved—Crops Increased:

When the land has been well broken, by plowing broadcast in fall or winter, it should be harrowed or disked at intervals when spring approaches, for the purpose of suppressing weeds, conserving moisture, preventing the formation of a crust and keeping the soil loose and mellow. Up to the time of planting, the field will be benefited if disked or harrowed after each rain as soon as the soil is dry enough to be worked. The modern method of planting is a great improvement over the old, and reduces the cost of putting down the Fertilizer and planting to less than half, and does the work better and takes much less time to do it in. This modern method is merely the application to cotton of the principle of economy in planting that has been applied to the planting of other crops. The modern cotton planter does all the work of putting down the Fertilizer and planting the seed at one operation and at about one-third the cost as compared to the methods still employed by some.

An Advantage Often Overlooked:

These combination Fertilizer distributors and planters will plant cotton, corn, cowpeas, peanuts, soy beans and similar seeds and may be procured of any up-to-date implement dealer. One advantage of these implements is due to the necessity for a well-

Mr. D. P. Ellis, of Oakland, Ga., believes in thorough breaking of the soil and ample applications of V-C Fertilizers. This crop was fertilized with 500 lbs. of V-C and afterwards given a second application of 100 lbs. He says it is the prettiest field of Cotton he ever saw on his place.

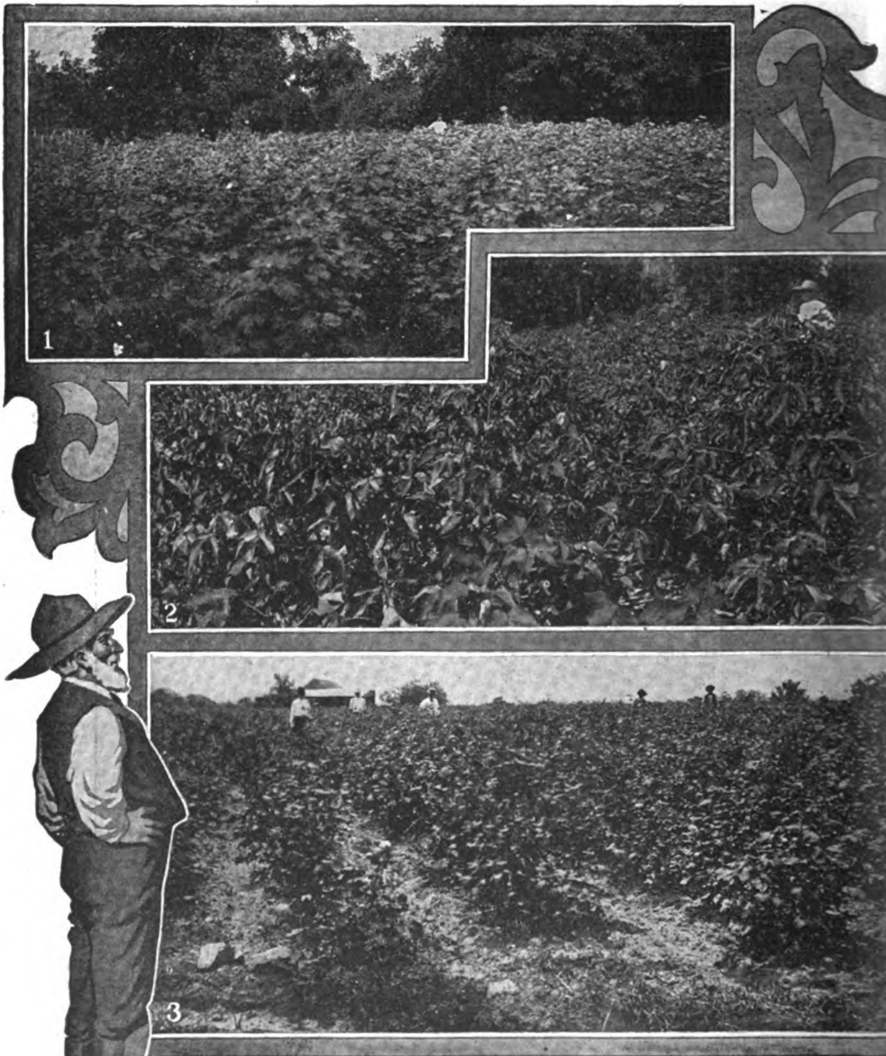
prepared seed-bed for their best use. This is an advantage that is often overlooked. Good preparation of the soil for planting gives better germination and insures a better growth, and admits not only greater economy in planting, but facilitates the use of labor-saving implements in the cultivation of the crop, and especially in its early stages of growth. The cost of planting and of cultivation are both reduced and a better crop is secured. A greater area may be cultivated in cotton or more time is secured for the care of other crops. The work is done in more appropriate season and is done better. The second and third applications of Fertilizer may be made to greater advantage and the use of the hoe is reduced by one-half or done away with entirely. The saving is not confined to the putting down of the Fertilizer and planting the seed, but extends in equal proportion to the cultivation of the growing crop.

Fertilizer Distributor and Planter getting ready for another bumper crop, because V-C is applied, and good seed planted. The two go hand in hand when best yields per acre are desired.

The Fertilization of Cotton

Waking Up:

It is a noteworthy fact that cotton farmers, as a rule, now claim that good commercial Fertilizers are used to greater advantage and earn a higher profit per acre and per ton of Fertilizer than in the past. There are several reasons for this. Better varieties of cotton are now being grown than formerly; better preparation is made for the crop and better cultivation is given.

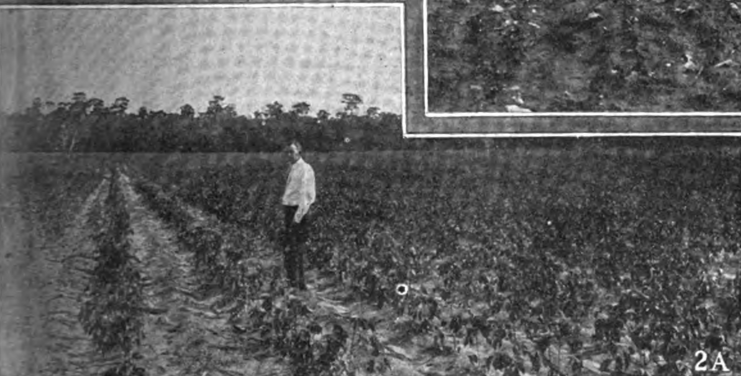


V-C APPLIED ON THESE THREE COTTON FIELDS.

1—V-C Cotton on McCandless Bros' Farm near Chester, S. C. 700 lbs. of V-C Fertilizer applied per acre resulted in 150 bales on 150 acres.

2—V-C Cotton on Mrs. W. S. West's Farm near Valdosta, Ga. 300 lbs. of V-C applied to the acre.

3—V-C Cotton field of Mr. E. Watson Gibson, Rossville, S. C. This Cotton is loaded with bolls and will produce over a bale an acre. 600 lbs. V-C Fertilizers were used to the acre.



V-C NOT APPLIED ON THESE THREE COTTON FIELDS

1A—Cotton field adjoining McCandless Bros' Farm, where V-C Fertilizers were *not* used. Though land is same as McCandless land adjoining, will take 4 acres to make one bale.

2A—Another view of Cotton on Mrs. W. S. West's Farm, where *no* Fertilizers were applied, will take 7 acres to make 1 bale of Cotton.

3A—Same class of land as on Mr. E. Watson Gibson's Plantation, but where V-C Fertilizers were *not* used.

The cotton farmer is "getting on to his job." A few uninformed people may say that too much Fertilizer is used under cotton. As a matter of fact not enough is used. In support of this statement we give two records, one covering a period of five years and the other a period of seven years:

Record No. 1 On Red Clay Loam Soil (five years' average). Proof of the Pudding:

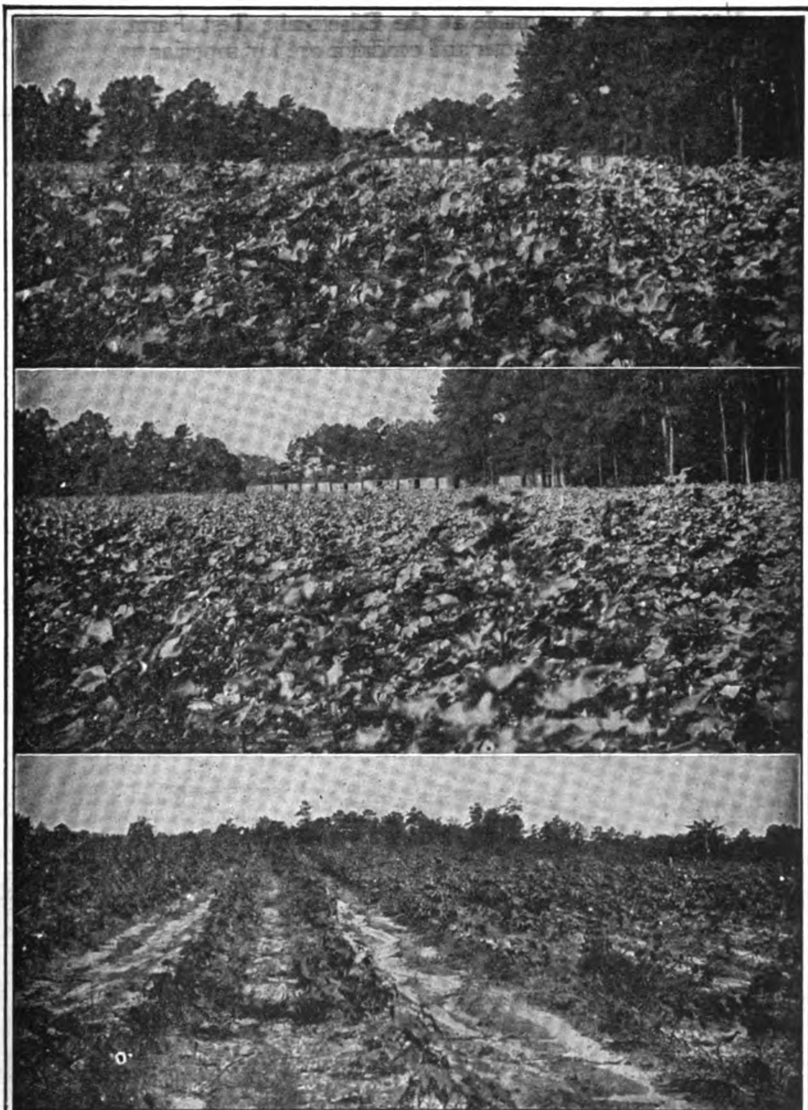
At the Iredell Test Farm the North Carolina State Department of Agriculture used commercial Fertilizers at the rate of a thousand pounds per acre, and, in comparison, varying quantities down to no Fertilizer, and got the following results:

Pounds of Fertilizer Used per Acre	Yield of Seed Cotton per Acre	Average Net Profit per Acre From Fertilizer Used
0	176.6 pounds	
200	656.5 pounds	$16.00
400	912.9 pounds	27.59
600	1,008.9 pounds	32.30
800	1,083.9 pounds	33.84
1,000	1,180.9 pounds	36.86

Record No. 2. On Fine Sandy Loam Soil (seven years' average).

Pounds of Fertilizer Used per Acre	Yield of Seed Cotton per Acre	Average Net Profit per Acre From Fertilizer Used
0	738 pounds	
200	842 pounds	
400	1,120 pounds	$11.45
600	1,249 pounds	17.04
800	1,472 pounds	25.33
1,000	1,582 pounds	28.53

Cotton grown by Mr. J. F. Saunders, near Smithfield, N. C. He used 1000 lbs. of V-C Fertilizers per acre. Yield 890 lbs. lint per acre. V-C makes good every time if properly applied.



Two upper views are on the Farm of Mr. H. D. Turner, of Lanes, S. C., photographed in September, 1915. Compare these two views with lower view of a Cotton field near Mr. Turner's farm, on which V-C was not used.

Record No. 2 was made at the Edgecombe Test Farm, where the soil, type, character and condition are far superior to the Iredell soil.

It must be remembered that these records show the profits given by the use of varying quantities of Fertilizers and not the gross receipts. The red clay loam soil of Iredell yielded, without fertilizer, only 176.6 pounds of seed cotton per acre. This indicates extreme soil poverty; yet 600 pounds of Fertilizer gave a profit of $32.00 per acre, 800 pounds $33.84 per acre and 1,000 pounds, or half a ton, profit of $36.86 per acre. The Edgecombe record was on a far superior soil to that of Iredell and the no-Fertilizer-acre gave 730 pounds of seed cotton per acre, or 561.4 more pounds of seed cotton than the no-Fertilizer-acre gave at Iredell. At Edgecombe 600 pounds of Fertilizer gave a profit of $17.04 per acre; 800 pounds a profit of $23.33 and 1,000 pounds a profit of $28.53 per acre. The average yield of cotton on all the fields in seven and five years, respectively, was:

Without Fertilizer, .325 of a bale.
With 400 pounds of Fertilizer, .725 of a bale.
With 600 pounds of Fertilizer, .805 of a bale.
With 800 pounds of Fertilizer, .910 of a bale.
With 1,000 pounds of Fertilizer. .985 of a bale, or almost one bale per acre.

Yield Doubled:

"The average annual yield of cotton in the State in the five years (1906 to 1910) was 215 pounds of lint, or .43 of a bale per acre. By using 800 pounds of Fertilizer per acre, on the basis of our tests, this yield would be more than doubled, or else produced on less than one-half the area of fairly good cotton land as labor and trade conditions might direct; or by applying 1,000

This fine-looking field of Cotton, consisting of 100 acres, was grown by Mr. D. T. Sapp, of Hawkinsville, Ga. Mr. Sapp appreciates the value of good fertilization for his Cotton and the Brands of the V-C C. Co. are well known to him. He knows that V-C Fertilizers are result producers.

pounds of good Fertilizer per acre to only good cotton land, a 500-pound bale of lint cotton could be made annually per acre on an average. It is true that the land on which our work was conducted had good preparation and cultivation, good seed and good Fertilization, but not as economical fertilization as we are using, and shall use in the future, on our general cotton crop. It is seen, however, that preparation, cultivation and seed will not take the place of needed plant food."

Taking the average of the five and the seven years' records we find that twenty acres without Fertilizer would have yielded 6.5 bales of cotton and that twenty acres fertilized with a thousand pounds of good commercial Fertilizer each would have yielded 19.7 bales. Assuming that it cost $20.00 per acre to plant, cultivate and harvest the twenty unfertilized acres we have:

$10 Loss or $532 Profit, Which?

20 unfertilized acres cost, at $20 per acre	$ 400.00
6.5 bales from the 20 acres, at $60 per bale	390.00
Loss on 20 acres	$ 10.00
Yielded 19.7 bales at $60 per bale	$1,182.00
20 acres fertilized with ½ ton of V-C Fertilizer per acre, at $25 per ton, and $20 per acre for planting, etc., cost	$ 650.00
Net profit from the 20 acres	$ 532.00

In these tests the treatment of the soil and the care of the crop were the same in every respect, save the use of Fertilizers on one and their non-use on the other. One was cultivated at a loss of $10.00, and the land was poorer than before the crop was

This Cotton was planted April 15th, when 300 lbs. of V-C Fertilizers were applied at time of planting; during third week in June, 150 lbs. more were applied. Picture taken July 30th. Each stalk has from 60 to 100 bolls on it. Crop produced over a bale an acre, whereas the land adjoining this 25-acre tract, which was *not* fertilized, did not yield a quarter of a bale.

grown; the other was cultivated at a profit of $532.00, and the land was much richer than it was before the crop was grown.

By neglect of good commercial Fertilizers the man and the land become poorer and poorer each year. By the judicious use of Fertilizers the land gives forth a rich profit, becomes more fertile after each crop, and the man reaps the benefit not only one year but each succeeding year also. The use of only a small quantity of Fertilizers may or may not merely sustain the soil. The wise use of a liberal quantity builds the soil. Small quantities of Fertilizers do not help the soil and do not give the desired profit. Liberal quantities make the soil richer and at the same time give an abundant and profitable crop. As much depends upon good Fertilizers as upon good Seed. The very best Fertilizers are the most economical always.

This Combination Fertilizer Distributor and Planter saves time and labor, for it fertilizes and plants at the same time. It marks off the next row, opens the furrow for the Fertilizer, puts it down, covers it, and then opens it again, drops the seed, covers them, and presses the soil down on the seed. Good seed and V-C make a good team.

How to Apply V-C High-Grade Fertilizers

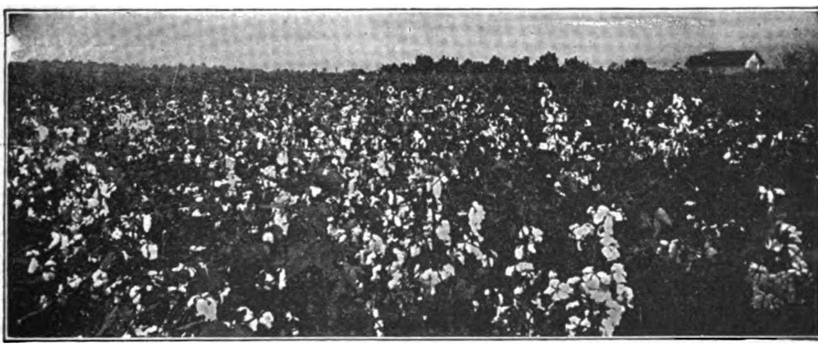
Best by Test:

The cotton farmer of today has many advantages over the planter of twenty years or even ten years ago. This is particularly true as to the means for treating the soil, applying the Fertilizer and in the quantity of Fertilizer applied. There has been great progress made in the manufacture of Fertilizers. The best Fertilizers on the market are composed of better materials; they are better mixed and more appropriately proportioned for the

crops they are intended to feed. It is the farmers' privilege to find out the best and use it. He should not be satisfied with a good Fertilizer but should buy the best, which by test is V-C High-Grade Fertilizers. Different crops demand different Fertilizers, and different soils demand different Fertilizers. Do not be satisfied with the fertilization of the crop alone, but fertilize the soil also. Build up the soil and the soil will build up the crop. Fertilizers should be applied not only to sustain, but to fatten the soil.

Thorough Spreading Important:

Some farmers have not gotten expected results from the use of heavy applications of Fertilizers for the simple reason, often, that they did not use good judgment in putting it down. In making heavy applications the Fertilizer should not be put down in a mass right under the seed. Fertilizers are concentrated plant food, and if not mixed with the soil are liable to do the young plants harm or even kill them. It is not, in the first place, advisable to put all of the Fertilizer down at one time, especially when heavy applications are made, and, in the second place, the Fertilizer should be mixed with the soil in the furrow when it is put down and the farmer should be careful and see that his Fertilizer distributor has attachments for mixing or is of such construction as to allow the Fertilizer to be spread. When very heavy applications are made it is often advisable to apply broadcast, though a good plan is to put down near, but not in, the row and on each side of the row. This may be done by running



"Upon 12 Southern States the world is dependent for fully 75% of its Cotton supply." If you want your acreage to produce a maximum crop of Cotton, you will be able to do so by the liberal use of V-C Fertilizer, which also improves the quality of Cotton.

twice with the distributor and planting the seed between the two furrows in which the Fertilizer was put down. One of the simplest ways to mix in the furrow is to have attached to the rear of the distributor one or two springs like the spring-tooth harrow points. These will not only mix the Fertilizer with the soil but aid in making a better seed-bed also.

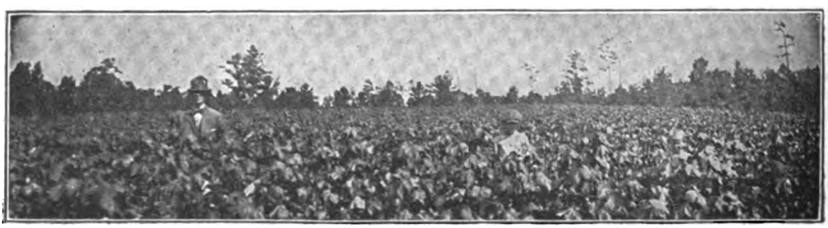
Net Results Count:

In the growing of all crops, and especially in the growing of cotton, the highest economic acre yield is the most important consideration. The profit from cotton comes not from the quantity a whole farm may produce, but from what the average acre will produce of profit above the cost of production. "A man and a team can only cultivate and harvest a certain number of acres of a given crop or crops. If the average acre crop yield be small and the profit small, or nothing at all, the net returns for the year's investment and effort are also small and unsatisfactory; but where the average acre yields are medium or large and increasing yearly, and the acre profits are in proportion, the net results of the year's work are substantial profits over cost of operation, which may be used in improving the farms and for better and more comfortable living."

An Authority Speaks:

Dr. B. W. Kilgore, State Chemist and Director of the North Carolina Test Farms, has this to say:

"The condition of the land, whether standing still, decreasing or increasing in fertility of productiveness, is intimately connected with the future of the man who owns or operates it. If more plant food is removed from the soil in the crop or crops grown on it than is added in Fertilizer, manure, soil-improving crops, or other ways, it cannot be expected and will not continue to yield as large crops in succeeding years as it did in the preceding ones during which it was being robbed. The following table



This bountiful crop of Cotton was raised on the farm of Col. W. C. Jones, near Jackson Springs, N. C. 600 lbs. of V-C Fertilizers were used per acre and three applications made.

Notice the very poor stand, bare patches and stunted growth in two upper views of Cotton field on which V-C was *not* used. Lower view is on farm of Mr. J. R. Collins, of Mullins S. C., who used 550 lbs. of V-C to the acre. Read Mr. Collins' comment on back cover He has used V-C Fertilizers for 15 years and knows.

shows the amount of the main plant-food constituents removed in the different quantities of lint cotton and seed corresponding to it used in the preceding part of this discussion:

Plant Food Removed From Soil by Different Amount of Lint Cotton and Seed

Yield per Acre.	Phosphoric Acid Pounds	Nitrogen, Pounds	Potash, Pounds
.43 bale	5.2	12.9	5.6
.86 bale	10.3	25.8	11.2
.91 bale	10.9	27.3	11.8
1.00 bale	12.0	30.0	13.0

"Experiments which have been running five to ten years on the Test Farm of the North Carolina Department of Agriculture, show quite clearly that where only 200 and 400 pounds of Fertilizer respectively have been used per acre, that the land has lost in productiveness and has not given yields in later years that it did in the former ones. When 600 pounds per acre was applied, the land has barely, if it really has, held its own; while with 800 and 1,000 pounds respectively, per acre, there seems to have been a gain in productiveness.

"In the table below is shown the amount of phosphoric acid, nitrogen and potash added to the soil in the Fertilizer experiments referred to and corresponding to what was removed in the cotton in the preceding table:

Plant Food Added in Different Amounts of 7-2-2½ Fertilizer

Fertilizer	Phosphoric Acid, Pounds	Nitrogen, Pounds	Potash, Pounds
300 pounds	21.	7.5	7.5
700 pounds	49.	17.5	17.5
800 pounds	56.	20.0	20.0
1,000 pounds	70.	25.0	25.0

"Except phosphoric acid, 200 and 400 pounds of the Fertilizer used did not supply as much plant food as was removed in the cotton; while 800 and 1,000 pounds supplied a considerable excess of both phosphoric acid and potash, but there was still a shortage of nitrogen for one bale, even with 1,000 pounds.

"The facts in these tables show quite clearly why it is necessary and will continue to be so, to supply plant food in some of the many ways (in Fertilizers, manure, soil-improving crops, etc.) if large and profitable acre yields are to be expected and the land is to hold its own or increase in value."

When small quantities of Fertilizers fail to give a profit in the increased yield of the crop they are used for, they cannot benefit the land; if large quantities give a profit, they also improve the land by increasing its ability not only to produce one profitable crop, but an indefinite number of increasingly profitable crops.

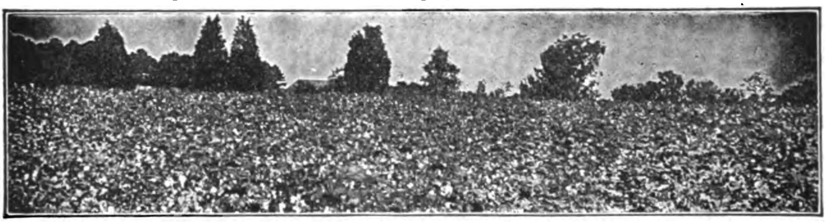
Rear view of Combination Fertilizer Distributor and Planter on page 32, showing more clearly seed box and roller. Good implements, seed and Fertilizer produce best results. Use V-C, which is the best.

For Cultivation of Cotton—Use Combination Fertilizer Distributors and Planters

Cheaper and Better Methods:

The implements and methods now employed in the planting of cotton are so far superior to those in use several years ago that the cultivation given the crop while it is in process of growth has been simplified, cheapened, and is done better than at any previous time in the history of cotton culture. The high beds, that formerly were made, have become known to be a useless and time-consuming operation and detrimental to high yields; are more difficult to culture economically and efficiently and are seriously conducive to the loss of soil moisture and to the washing away of the soil. At the up-to-date implement stores combination Fertilizer distributors and planters may be procured and these implements do their work so well as to materially lessen the cost of cultivation where they have been properly

used. They open the furrow, put down the Fertilizer, cover and mix it, drag down the low bed, open again, drop the seed and cover them, and at the same time mark off the next row—all done at one and at the same time. These machines leave the whole surface in good condition for both early and subsequent cultivation. Chopping and hoeing have been so simplified by the good work of these improved implements as to reduce to half, or less than half, the time formerly required for chopping and hoeing. The work is done better and at a time when it does more good. Modern weeders and cultivators that work one or two rows at a time, have taken the place of the discarded side-sweeps and buzzard-wing sweeps, the scrapes, the scooters, the bull-tongues and the turning plows.



This beautiful field of Cotton was grown by Mr. L. T. Garner, of Weldon, N. C., on which he used 400 lbs. of V-C Fertilizers.

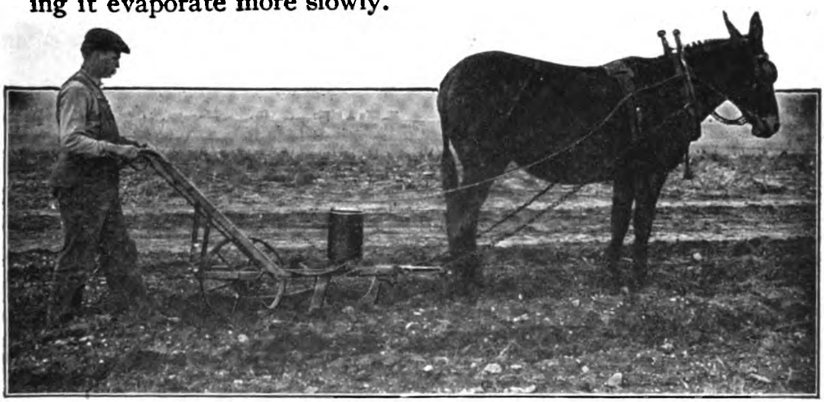
Preparing Soil for Cotton Planting

Break Before Bedding

Cost of Cultivating Reduced:

"In making preparation for the planting of cotton a large number of farmers still bed without first breaking. This is a serious mistake. It saves no time but requires more and the work is not well done. Remembering the great advantage that comes from thorough preparation before planting, the cotton planter should realize that the simplest, least expensive, quickest and best way to prepare land for cotton is to break it broadcast, disk and harrow until a good seed-bed has been made and then use the best combination Fertilizer distributor and planter procurable. Such a beginning is not only the best for getting ready for planting but also leaves the surface in such a shape as to reduce the cost of cultivating the growing crop by at least one-half, if advantage is taken of the weeders, cultivators, etc., that have become so efficient and are deservedly popular when used on properly prepared land.

Land that has been well prepared can be far more easily cultivated, and cultivated better and in less time. The object of cultivation is not merely to kill the weeds that may be present but to keep the surface open and porous by preventing a crust from forming. This crust forms after each rain if not prevented. To prevent it the soil must be stirred after each rain as soon as it is dry enough to stir and before it has sufficiently dried to allow a crust to form. In the meantime a new crop of weeds has germinated and the cultivation kills them before they have done harm and when they may be more easily killed than at any subsequent time. It is now known that changes are constantly taking place in the soil and that air and bacteria exercise an important part in the bringing about of these changes. The shallow stirring of the soil not only admits air but supplies conditions favorable to the development and multiplication of beneficial bacteria. Thus the stirring of the soil soon after each rain breaks up and prevents crusting, kills weeds, admits air, promotes bacterial activities and probably greatest of all, checks the loss of soil moisture by making it evaporate more slowly.



This implement is one commonly used in the South for planting Cotton, Corn, Cowpeas, Sorghum, etc. This Planter follows Fertilizer Distributor as shown on page 27. Get the best seed, and use the best Fertilizer which is V-C.

Best Time for Cultivation of Cotton

The Right Way Is the Best Way:

If cultivation is a good operation (and every one knows it is) every effort should be made to cultivate with the best implements at the best time and in the best manner.

The best implements for one soil may not be the best for another. However, the best implement for any soil in need of cultivation is that implement which will do the work quickest and best.

The best time to cultivate is as soon after each rain as the soil is in condition to be worked. The length of time to wait will depend upon the amount of rain that has fallen; the character of the soil; the season of the year; the velocity of the wind; the humidity of the air and the amount of sunshine. It may be immediately after some rains or it may be several days after some rains, as the soil characters and weather conditions may require.

The best manner of cultivation is that which will stir thoroughly all of the soil surface to the proper depth and at the same time not break or mutilate the roots of the crop being cultivated. The finer the surface is made the better the crop will grow. Every clod in a field is so much soil with its food content removed from the reach of the crop. Clods are usually made by working the ground either when it is too wet or too dry.

Perfect rows of Cotton on tarm of Mr. W. T. Scroggin, ot Centre Ridge, Ark. He used V-C Fertilizers for over 10 years, and will use no other.

"Laying-By" the Cotton Crop

Do Not Injure or Abuse:

A large proportion of the cotton crop is not cultivated as late as it should be. Some farmers think there is a certain day for the "laying-by" of the crop. Some fix this day at July 1st, some July 15th, or August 1st, etc. This is a serious mistake. No day in any month of the year can rightly be fixed as a time for cultivation to cease. So long as the condition of the soil needs cultivation, cultivation should be given, if the condition of the crop will permit. Cultivation benefits the soil directly and the crop indirectly. If a certain day in a month is assumed to be the

time for cultivation to cease and a rain should fall after the cultivation had been given, another cultivation is needed just as much as before and should be given, provided, of course, no injury is done the crop by breaking or brushing either the plants or the roots.

The cotton grower should do all he can to get the best out of his soil and yet not injure or abuse it. There is no one act on the part of a man who tills the soil that will bring a full measure of reward for his labor. It is an insult to a good soil to plant poor seed on it. It is abuse of the soil not to rotate. It is neglect of the soil if it is not broken deeply and thoroughly. It is ignorance and neglect of an opportunity not to use an abundance of the best commercial Fertilizer and it is losing what has been gained not to cultivate frequently, shallow, thoroughly and late.

* * * * * * * *

Mr. D. P. Ellis, of Oakland, Ga., is another V-C enthusiast, and no wonder. He admits his field of Cotton is the best he ever saw. He used 500 lbs. of V-C High Grade Fertilizers, afterwards made a second application of 100 lbs. per acre of V-C Top Dresser.

Top Dressing Cotton

Or Late and Frequent, or Side Applications of Fertilizer to Cotton

An Extra Feed Helps:

Fertilizers applied for cotton are usually put in the ground a week, ten or twenty days before the seed are planted and long before there is any possible opportunity for the plants to use them; and for two months after the seed are planted, the plants are small in size and have use for but a small quantity of the

Fertilizers which have been in the ground two or three months. Over a great part of the cotton sections the cotton plants make but a small proportion of their growth in April, May and June and not until July have any appreciable number of blossoms opened. Before July, the cotton plant is only getting ready for its great work, but from July on until the crop is made, it is busy at its great work, and it is then that it needs all of the help that it can get—the best of cultivation and the best of plant foods and both in abundance. After about the first of July, the plant not only makes its greatest growth, but must support its squares, blossoms, bolls, seed, and lint as well as branches and leaves, and while it is doing this the Fertilizers applied before planting are about all gone. The plant is prepared to make a big crop, but has not the material to make it with unless an additional application of "V-C High-Grade Fertilizer" plant food is given.

Every foot of this wonderful Cotton field was fed by V-C Fertilizers. V-C is not alone a permanent soil builder, but an excellent crop food.

Starving the Crop:

The old practice of applying all the commercial Fertilizers before the cotton is planted leaves the Fertilizer in the soil for several months before the crop can use more than a third of its required plant food. In the meanwhile, heavy or continuous rains, or both, dissolve and carry away the soluble phosphoric acid, nitrogen and potash, and there is not enough plant food left for the making of a crop. Consequently the leaves turn yellow, growth ceases, and the squares fall off. Many cotton growers will say, when they see the disastrous consequences, that the "Fertilizer is burning the crop up," while the real trouble is that the crop has used up all the Fertilizer, its food supply is exhausted and it is throwing off the fruit it cannot support. Can there be anything more logical or rational under such circumstances than the giving of more food, the adding of more

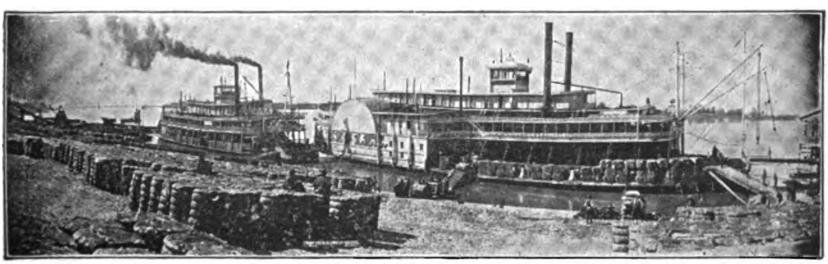
"V-C High-Grade Fertilizers," and at the time when they are most needed?

Healthy Growth Needs Healthy Food:

As the cotton plant grows and doubles and doubles, and again doubles in size, its demands for materials to make this rapid growth doubles and doubles and again doubles, while as a matter of fact the supply of Fertilizers in the soil is rapidly decreasing and becomes unable to supply the needs of the crop. The growth checks, leaves become yellow, the plant looks sick and the squares fall off. An ample supply of plant food given the crop at intervals through this time, by the liberal use of "V-C High-Grade Fertilizers," applied when the crop is being given frequent and good cultivation will remedy all this trouble give the crop a strong, vigorous growth, and enable it to set a full crop, hold it through maturity and reward the cotton grower with an abundant yield and great profit, and leave the soil in better condition for the crop which is to follow the cotton.

Feed Well and Feed All Over:

Up to the time when the first blooms open the cotton crop devotes its energes to the laying of a foundation upon which the crop is to be built. A liberal supply of "V-C High-Grade Fertilizer" is necessary for the building of this foundation. When the foundation is complete a liberal supply of "V-C High-Grade Fertilizers" is necessary to the development of the fruit. Through the first period of development, it is obviously necessary that an ample plant food supply be present, since a well developed, a well-fed stalk with an abundance of healthy leaves is necessary for the development of an abundance of healthy bolls well filled with seed and lint; and since both seed and lint are developed in July and August there must at this time be an



All aboard for Bigger Crops and Better Crops! By using the V-C route your crops will be assured of a profitable journey every time.

abundance of "V-C High-Grade Fertilizer" available for their growth. The development of the cotton plant is divided into two parts, one extending from the germination of the seed to blooming time and the other from the blooming time to the full development of the crop. Through the first period the plant is preparing for its life work, the making of fruit. If this preparation is to be good the crop must be given the best cultivation and an abundance of the best "V-C High-Grade Fertilizers." When the heaviest task comes, when the crop must continue a vigorous development of the stem, branch and leaf, and at the same time put on a heavy crop of fruit, we find that too many cotton growers assume that the plant can take care of itself, and at this most critical period it is left to its own resources, when it has its heaviest work to do and when the early applied Fertilizers have been constantly drawn upon and not replenished. It is now a universally established fact that plants must be fed, and fed when they need food. The old practice of feeding a crop once is good so far as it goes. The new and up-to-date practice of feeding frequently and when the crop needs to be fed, goes all the way. The feeding of a cotton crop once and no more, is like the old woman who fed her dozen hens carefully and regularly up to the time they began to lay, but then put them in a coop and gave them no more food.

When Food is Needed Most:

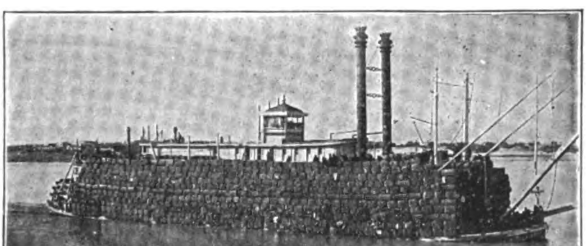
Between the time that the first bloom opens and the last bloom that makes a mature boll is the busy season with the cotton plant. It then demands more food than at any other

A Bale and a half per acre was what this Cotton crop yielded. Mr. W. H. Rea, of Shannon, Miss. He used V-C Fertilizers in producing this gratifying result.

period of its growth and the amount of crop produced is controlled by the quantities of the elements of plant food available at that time, and it is at this time that the greatest deficiency occurs since it is at this time more plant food is taken from the soil than at any other, and taken from it more rapidly. V-C High-Grade Fertilizer Top Dresser for cotton supplies the right materials at the time they are most needed. The cotton yields for the past several years have been most satisfactory and profitable, notwithstanding the boll-weevil, drought and floods, and these good results in both quantity of cotton produced and the profits it has brought is due mainly to the better understanding by cotton growers of the principles of fertilization.

Two Important Influences:

The two most important influences responsible for these desirable results is the making of frequent applications, rather than one, of the "V-C High-Grade Fertilizers" and in the use of them as a complete Fertilizer rather than as one containing a single element of plant food. If the Fertilizer applied before the crop is planted is needed, if there is then a deficiency of nitrogen, potash and phosphoric acid when the plants demand the smallest quantities of these elements, it necessarily follows that the deficiency will be greater when the plant is in full and vigorous growth in June and July. At this time the Fertilizers applied early have been used by the plant and the crop is then needing five or ten times more plant food than earlier. The crop is grown for its fruit, and when the fruit is developing, the quantity that will be produced will depend upon the presence of materials in the soil with which the fruit is to be made. These materials are nitrogen, phosphoric acid and potash, and if they are not present in the soil they must be applied if good crops are to be

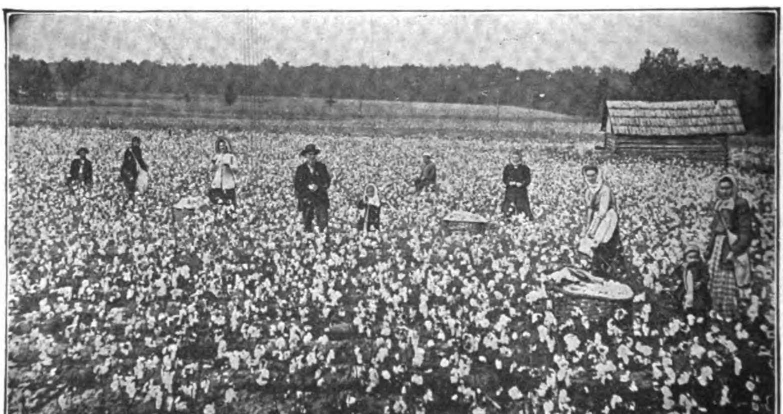


4000 Bales of Cotton on steamer "T. P. Leathers," entering Memphis harbor. No crop responds so profitably to fertilization as Cotton, the better the Fertilizer the better the crop. V-C is the *best* Fertilizer as attested by thousands of Cotton Growers.

produced. "V-C High-Grade Fertilizers" supply the farmers with just the plant foods needed at this period of growth, and great crops follow their timely application. When only a sufficient quantity of Fertilizers is applied to satisfy the needs of the crop for which the Fertilizers are primarily intended the land is left, when the crop is taken off, in an exhausted condition and the crop that follows has no left-over food for its sustenance. On the other hand, liberal applications of Fertilizers to the growing crop not only gives a profit in the increased quantity of yield, but the natural resources of the soil are not drawn upon so heavily and the soil is, after each crop is removed, in a better state of fertility. This is an important step in the direction of the permanent improvement of the soil. The permanent improvement, the gradual upbuilding of the soil that it may each year give an increased yield over the previous year is the most fundamental principle of good farming, and frequent late applications of an abundance of "V-C High-Grade Fertilizers" are one of the surest means by which the cotton grower may make each crop more profitable than the previous one.

Better Crops—Greater Profits:

The value of winter cover crops for the prevention of washing, for the trapping of nitrogen, for furnishing an abundance of cheap, but excellent roughage, hay or pasture for live stock, is being more and more appreciated. The late application of

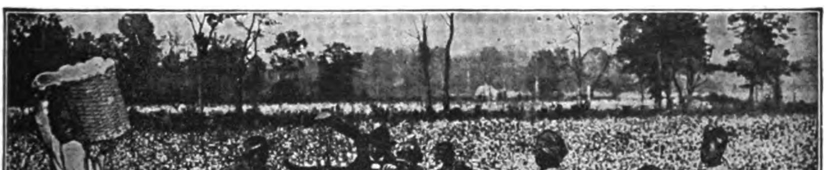


Not a snow scene, but a beautiful field of Cotton on the farm of Mr. John E. Cunningham, of Lexington. Tenn., on which V-C Fertilizers were used.

liberal quantities of Fertilizers to the crops preceding these winter crops doubles the yields of the winter crops and more than doubles their value as conservators of fertility and as animal feed. The growing of winter cover crops for any purpose leaves the soil in condition to produce better crops of cotton, corn or other crops, enables the farmer to apply larger quantities of "V-C High-Grade Fertilizers," and with greater profits, and all together tend to make the soil richer and richer after each crop.

Proper Application:

The Fertilizer distributors in common use may be employed for making late applications. Simply fill the distributor and operate it as you did in putting down the Fertilizer before planting, but run it on one or both sides of the row about one and one-half or two inches deep and from six to twelve inches from the row for the first application, if the plants are not too large. If the plants are large, run just far enough from them so as not to damage them. Do not break any roots, for the roots are there to take up this Fertilizer. The late application should be made before or at the time a shallow cultivation is being given the crop. Some run an extra plow to open a furrow into which the Fertilizer is placed, but this makes the operation more expensive, is no better than when all is done at once, and there is greater danger of mutilating the roots.



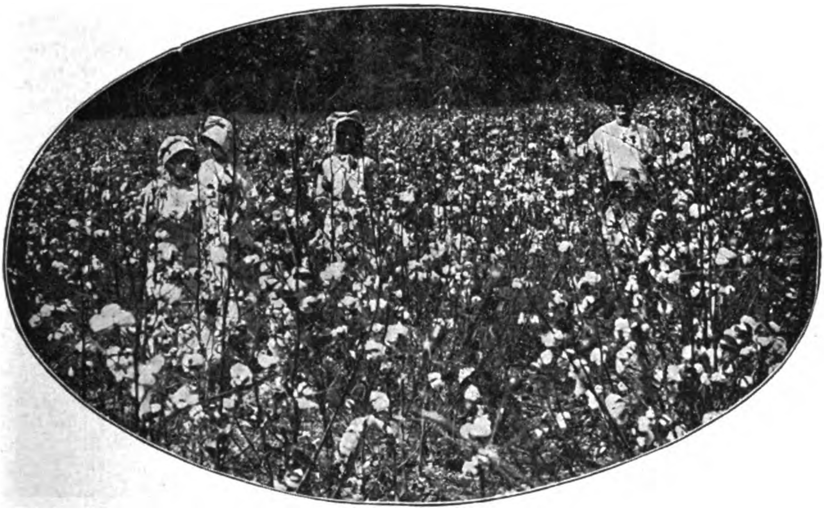
Mr. J. L. Manley, of Juno, Tenn., is a successful Cotton grower. He says: "I am well pleased with the show your V-C Fertilizers are making. Cotton is 100% better where V-C was used than where it was not used." Such Cotton Crops as shown above are the result of using V-C Fertilizers wisely and liberally.

Late Applications Money-makers:

The establishment of the fact that late applications of Fertilizer is a money-making operation has stimulated all the manufacturers of implements for the cultivation of cotton to place on the market combination Fertilizer distributors and cultivators designed especially for the purpose of making late applications and at a minimum of cost. No successful farmer can afford to be without one of these implements. These combinations and labor saving implements put down the Fertilizer as the crop is being cultivated with almost no additional cost and do the work more economically and better than any other way that has been tried.

Isn't this a picture to gladden the heart of every Cotton grower? Once poor land now so improved by the proper use of V-C Fertilizers that Mr. D. J. Epps, of Kingstree, S. C., who owns this 20-acre tract, says that he expects to get $2000 worth of Cotton from this field. He uses no other Fertilizers than V-C.

As a matter of fact the cost of making the late applications is practically done away with. The best forms of these combination implements are two horse riding cultivators equipped with Fertilizer hoppers forward on the frame and geared with the axle. These apply the Fertilizer on either one or both sides of the row



Mr. T. W. Shackleford, of Kellyville, Texas, is a satisfied Cotton grower. This photograph was taken in his field of fine Cotton, showing its profusion of growth, the result of using V-C Fertilizers. It *does* pay to use V-C.

and cultivate both sides of the row. The whole operation of cultivation, putting down the Fertilizer and covering it is done by one passage of the implement. The writer uses these implements and, if he could not get others, would not part with them for twenty times their cost. With such an implement additional applications of Fertilizers may be made at each cultivation with no additional expense than that of hauling the Fertilizer to the field and the filling of the hoppers.

Save Your Soil:

Except in cases where there is a special and well established reason for it neither potash, phosphoric acid nor nitrogen should be used alone when late applications are made. There are occasions when they may be used alone. This is more true of nitrogen than of potash or phosphoric acid. Nitrogen induces a green and more succulent growth than potash or phosphoric acid. The farmer is often deceived by the richer color of the plants to which nitrogen alone has been applied. That a healthy, vigorous growth and an abundance of fruit may develop, phosphoric acid and potash should be used with the nitrogen, since it is the appropriate combination of all three of the elements of plant food in a Fertilizer which induces a quick and healthy growth, abundant fruit and increases the profits without exhausting the soil.

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Free V-C Crop Books

THE Agricultural Service Bureau of the Virginia-Carolina Chemical Company issues a series of crop books similar to this one, which every farmer or land owner will find full of practical suggestions and information on the growing of the leading farm crops.

Each book covers all the steps in the production of the crop, including Soil Management, Soil Preparation, Selection of Varieties, Planting or Setting, Fertilization, Culture, Pest Control, Harvesting and Marketing. The titles of the books and the crop they cover, are as follows:

1. **Cotton.**
2. ***Corn.**

   Field Corn — Sweet Corn
3. ***Tobacco.**
4. ***Wheat, Oats, Rye, Barley and Rice.**
5. ***Grasses for Hay and Pasture.**

Grasses	Alfalfa
Clovers	Cowpeas
Millets	Soy Beans

6. ***Vegetables and Truck Crops.**

Asparagus	Egg Plant	Pumpkins
Beans	Garlic	Radishes
Beets	Leek	Shallots
Cabbage	Lettuce	Spinach
Cantaloupes	Onions	Squash
Cashaws	Peas	Tomatoes
Cauliflower	Peppers	Watermelons
Celery	Potatoes, Irish	Hot Beds
Cucumbers	Potatoes, Sweet	Cold Frames

7. ***Strawberries and Other Berries.**

Blackberries	Raspberries
Dewberries	Strawberries

8. ***Orchards and Good Fruit.**

Apples	Nectarines
Apricots	Peaches
Cherries	Pears
Grapes	Plums

9. **Citrus Fruits and Truck Crops.**

Grape Fruit	Oranges
Lemons	Pineapples

   Subtropical Truck Crops
10. **Peanuts.**
11. **Sorghum and Sugar Cane.**

12. **The Boll Weevil and How to Fight It.**

13. **Making Soils and Crops Pay More.**

A Practical Discussion of Soil and Fertilizer Problems.

14. **Apples.**

15. **Sugar Beets.**

16. **Peaches.**

*Indicates that two editions are available, one adapted to Southern conditions, the other to Northern and Western practice.

If you have any question in regard to the Management of the Soil. or the Growing of Crops, which the books do not answer, write the Bureau, stating your problem, and your letter will be given prompt attention. This service is free.

Agricultural Service Bureau, Corp.
Virginia-Carolina Chemical ~~Company~~,
Richmond, Virginia.

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☐ 4. **Small Grains**	☐ 12. **The Boll Weevil**
☐ 5. **Hay and Pasture**	☐ 13. **Making Soils and Crop Pay More.**
☐ 6. **Vegetables and Truck**	☐ 14. **Apples**
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☐ 8. **Orchards**	☐ 16. **Peaches**

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V-C AGRICULTURAL SERVICE BUREAU.

Although the supply of plant food a soil is able to furnish is one of the determining factors in crop production, other conditions are quite as important. Plants must have for their home a soil that is well drained, that is in good physical condition and that is not too acid. These conditions must be corrected in order to get the best results from the use of fertilizer. Further, the preparation of the soil, the kind of seed used, and the methods of cultivation may vitally affect the yield of the crop.

The Virginia-Carolina Chemical Company recognizes these facts, and in order to aid the farmer in securing the best results in growing of crops, has provided within its organization an

AGRICULTURAL SERVICE BUREAU

directed by a practical and scientific agronomist, who will give personal attention by letter to any question pertaining to soils and crops the reader desires to ask. This service is free.

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Virginia-Carolina Chemical Company
Richmond, Virginia.

Crops for Hay and Pasture

Northern and Western Grown

The old Flemish proverb, "No grass, no cattle; no cattle, no manure; no manure, no crops," expresses in a very forceful manner the importance of grass culture in general farming. It is a noticeable fact that in those general farming sections where a considerable number of livestock are kept the farmers are usually prosperous. The production of hay and pasture crops is largely responsible for that success.

Importance of Hay and Pasture Crops

The hay crops alone rank in importance with corn. The total wealth produced from pastures is almost, if not as great as that produced from hay. In many sections of the country one or the other or both of these crops constitute the chief source of the farmers' income. In spite of this fact, pastures and hay crops are receiving too little attention in many hilly sections.

Hilly land can not be too frequently planted to tilled crops without being greatly damaged by erosion. Experience has demonstrated that such land should be kept in hay or pasture for several years and then only planted to a tilled crop one year before being again sown to small grain and then to grass and clover. By following such a system, erosion may be almost entirely prevented, fertility may be maintained, and a profitable system of farming developed.

Management of Pastures

There is probably no other farm enterprise that has received less attention than pastures. They are grazed too early, too late and too heavily; weeds and bushes are permitted to grow up and choke out the grass; no manure or fertilizer is applied to keep up production; still the farmer complains because the pasture does not furnish abundant grazing throughout the entire grazing season. The fact is that no other crop does as well under such abuse.

The pasture will respond to good treatment just as well as other crops. In the late summer, fall, or winter all bushes should be grubbed out and piled and then hauled off or burned. Logs and sticks should also be removed as they occupy space on which good grass will grow.

Pigs on Rape Forage, Experiment Station, Lafayette, Ind.

Sheep on Rape Forage, Experiment Station

The weeds in pastures should be cut with a mowing machine just before they come into bloom. This is the only practical way of keeping them from producing seed and becoming more troublesome each year. By following this practice for several years the grazing on many permanent pastures can be much improved.

When the stand of grass is not good in spots it can be improved by disking in early spring and then sowing a mixture of Kentucky blue grass, red top and white clover. The land should then be gone over with a spike-tooth harrow for the purpose of covering some of the seed. Harrowing each year is unnecessary. When droppings accumulate on the pasture and the cattle refuse to eat the grass around them, the pasture may be gone over with a light spike-tooth harrow for the purpose of distributing the droppings so the cattle will graze the pasture uniformly.

Loading Alfalfa Hay with field loader. In modern times many labor saving appliances have come into popular favor among the progressive farmers.

Fertilizing Permanent Pastures

A pasture can hardly be expected to furnish abundant grazing year after year without some kind of fertilization. On steep side-hills an application of 6 to 10 tons of rough farm manure may be applied occasionally to good advantage. An occasional manuring is especially advisable on spots where the stand of grass is thin. Reinforcing each two-horse load of manure with 30 to 50 pounds of acid phosphate is generally advisable. As a rule, manure should be applied in early winter or early spring as these are the times of

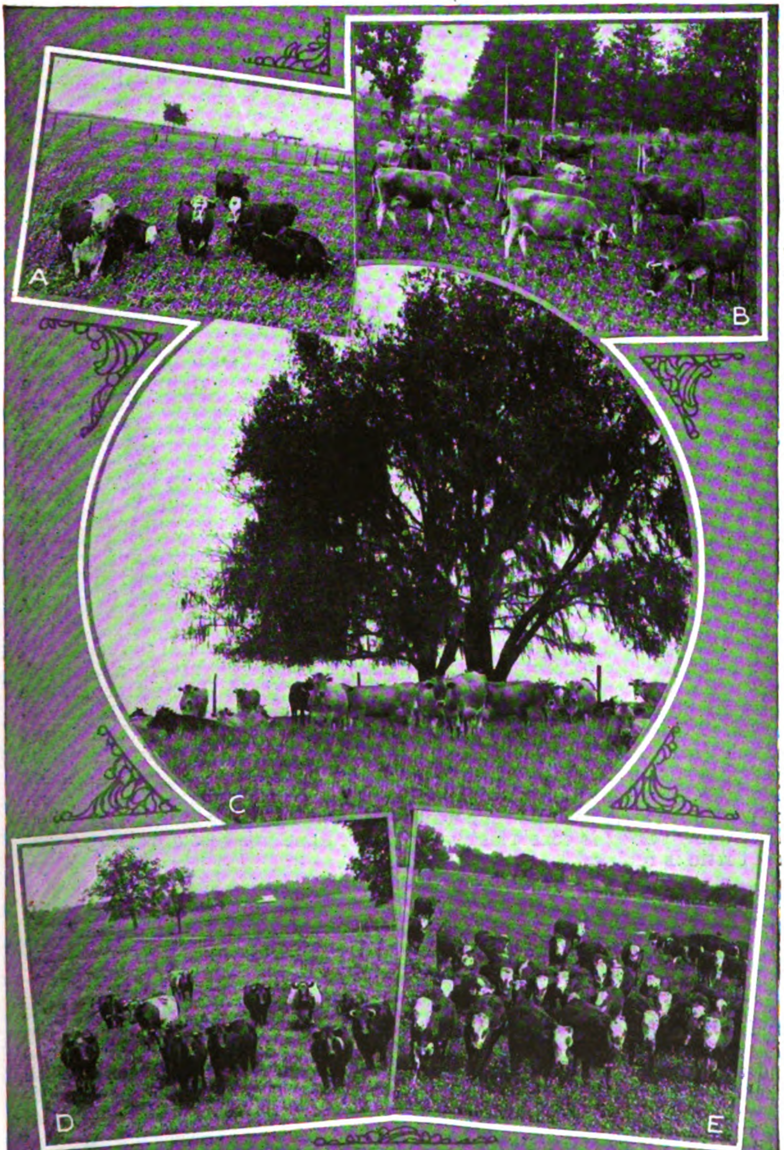
the year most favorable for the absorption of the soluble plant food contained.

In European countries pastures are frequently treated with commercial fertilizers and experiments have shown the practice to be very profitable. The use of 200 to 400 pounds of V-C acid phosphate to the acre may be safely recommended in sections where phosphate fertilization of tilled crops has proven profitable. On thin soils a fertilizer containing 2 to 4 per cent of nitrogen and 10 to 12 per cent of phosphoric acid may be used.

Liming Permanent Pastures

In sections where the soil is very acid an application of limestone will increase the herbage greatly. In most instances it should be applied at the rate of 2,000 to 3,000 pounds per acre. Hydrated lime and marl may also be used when they can be obtained more cheaply than ground limestone. If the pasture is cut with a disk just before the limestone is applied very little of it will be washed off, even on quite steep sidehills.

A prize winning Holstein Cow such as this one is an asset to any farmer. Rich luscious grass makes rich milk—use V-C Fertilizers for the grass.



A—Sweet Clover Pasture, University of Illinois, Urbana, Ill. Sweet Clover may be pastured until June and then the cattle removed and seed crop produced. V-C Fertilizers are very beneficial in obtaining a rank growth of sweetclover.
B—Jersey Cattle on Rich Clover Pasture. Ceylon Court Farm, Lake Geneva, Wisconsin.
C—Contented Jersey Herd. A stockman can well be proud of such a splendid herd as this.
D—Shorthorn Cattle on Blue Grass Pasturage, J. R. Harlow, Kempton, Indiana.

Grazing Pastures

One of the most neglected points in pasture management is grazing too early. When the grass gets green in spring, the supply of winter roughage may be a little short, the stock are eager to get some spring tonic and the farmer just can't resist the temptation to turn them in. Once they are on pasture the chances are ninety-nine to one that they won't be removed. This is the time that pastures are most easily injured and also the time the grass is of least value, except for the toning up effect it has on the system.

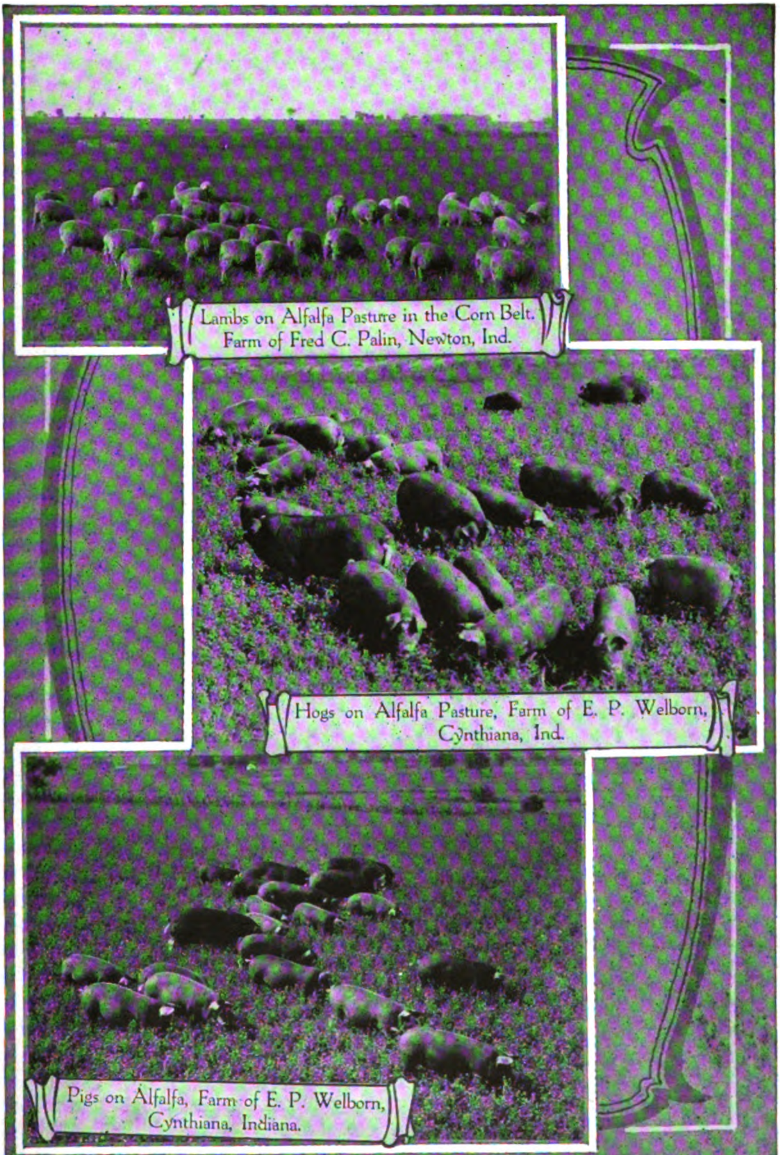
Young grass is easily injured by early grazing. The development of root growth depends to a large extent upon the chlorophyll gathered by the green top and transferred to the root system. If the plants are not allowed to make much top growth, the root growth will be small and the pasturage correspondingly short. If the maximum amount of pasturage is desired, stock should not be turned on until the grass is at least four inches high. It will then contain more food nutrients, will be less "washy" and will not be so easily injured by grazing. If the grass is allowed to make a strong, vigorous start before it is grazed in the spring it is less likely to be injured by close grazing in summer; still too close grazing should not be permitted as it will reduce the amount of pasturage.

Other points which are not given careful attention are grazing too closely and too late in the fall. Early spring growth depends to a large extent upon the amount of nourishment stored up in the roots of the plants in fall. This in turn depends upon the amount of top growth the plants make. If the grass goes into winter with three or more inches of growth, this will furnish considerable protection during the winter and the plants will make an earlier and more vigorous start than they would if closely grazed in fall.

The practice of dividing the pasture and then alternately grazing the two halves has been recommended as a means of increasing the amount of pasturage. Recently conducted experiments indicate that farmers have been wise in not going to the extra expense required to put this method into practice. In grazing sections where pastures are large such a method might be followed to advantage. In the Blue Grass region of Kentucky it is common practice not to graze one pasture from June until October. During this time the grass makes a strong, vigorous growth and is then suitable for grazing in fall up to the time winter sets in. By following such a system the grazing period is considerably lengthened and the cost of raising sheep and cattle is reduced.

Seeding Permanent Pastures

Two methods of seeding permanent pastures are practiced: (1) seeding a mixture of grasses and clovers alone in late summer or early spring and (2) seeding a part of the grasses in fall with wheat or rye as a nurse crop and then sowing the other grasses and clovers in the early spring. Both methods are practiced with good results. The second method is undoubtedly preferable for hilly land. On gently rolling and level land either method may be practiced, but the second is usually more economical.



Lambs on Alfalfa Pasture in the Corn Belt. Farm of Fred C. Palin, Newton, Ind.

Hogs on Alfalfa Pasture, Farm of E. P. Welborn, Cynthiana, Ind.

Pigs on Alfalfa, Farm of E. P. Welborn, Cynthiana, Indiana.

Preparing the Seed Bed:

Stubble or sod land should be deeply plowed six or eight weeks before seeding time. In most instances disking thoroughly before plowing will aid materially in plowing and also in thoroughly preparing the seed bed. After plowing, the disk, roller and spike-tooth harrow should be used to thoroughly fine and firm the seed bed. It should be remembered in this connection that a good seed bed is difficult to obtain without one or two good rains to settle and firm the soil. Best results will be obtained by having the seed bed thoroughly fined and firmed throughout except one to two inches of loose soil on the surface.

Acid Phosphate and Lime produced 4,000 lbs. to the acre on the Clover Field at the Indiana Experiment Station. Lime alone only produced 1,600 lbs. an acre. The two stacks tell the story, each representing the yield of 1-20 of an acre.

When seeding on stalk land or land which has been in a cultivated crop, plowing is not necessary. The soil may be properly fitted by double disking, rolling and harrowing or by using spring-tooth, roller and spike-tooth harrow.

Liming:

In sections where the soil is acid an application of two to four tons of ground limestone should be applied to the acre just after plowing so it may be thoroughly incorporated with the surface soil by the subsequent harrowings. The finely ground part of the limestone may then be expected to produce quick results.

The value of limestone for correcting soil acidity and increasing the yield of clover and alfalfa is getting to be quite thoroughly appreciated but it is not generally thought that similar results may be obtained on hay and pasture grasses. It has been strongly demonstrated by both experience and experiments that limestone gives large increases when applied for hay and pasture grasses. On all soils that are much acid its use will produce two to three dollars for each dollar invested.

Fertilizing for Permanent Pasture:

Just before seeding is the best time to fertilize a pasture. The fertilizer can be easily applied with grain drill, lime sower or by hand and then worked into the surface soil. When this is done maximum results from its use may be expected.

Pigs thrive on a forage of Peas and Oats. When V-C Fertilizers are applied the yield of forage per acre is greatly increased.

Except for the small amount of droppings left on the pasture, no fertilization is usually given. In fact, the pasture receives almost no fertilization after being seeded and very frequently little or none at the time of seeding. This is a great mistake. Pasture grasses and clovers require plant food just as well as cultivated crops and will respond to their application just as much. Phosphorous is usually needed more than either potash or nitrogen, but frequently the latter two are also needed.

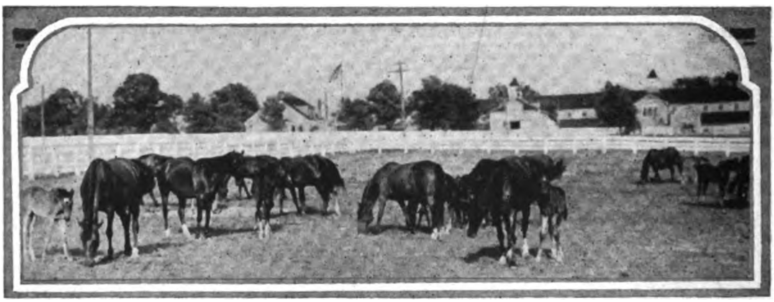
When seeding with small grain as a nurse crop 400 to 600 pounds of V-C acid phosphate may be applied to the acre on rich clay and loam soils. On thin clay and loam soil 400 to 600 pounds of V-C Fertilizers containing 2 to 4 per cent nitrogen, 8 to 12 per cent phosphoric acid, and 2 to 4 per cent. of potash should be applied. On black sandy loam and muck soils 300 to 500 pounds of a fertilizer containing 6 to 10 per cent of phosphoric acid and 8 to 12 per cent of potash should be used.

Grass Mixtures for Permanent Pastures:

The kind and quantity of grasses and clovers best suited for making a permanent pasture will depend upon the type of soil, its fertility and the treatment given The following recommendations are general and may frequently be changed with good results. The amounts given are for one acre.

Mixtures for Acid Clay Soils:

(1)	Kentucky blue grass	6 pounds
	Red top	6 pounds
	Timothy	6 pounds
	Alsike clover	3 pounds
	White clover	2 pounds
(2)	Orchard grass	8 pounds
	Red top	6 pounds
	Timothy	4 pounds
	Alsike	4 pounds
	White clover	2 pounds



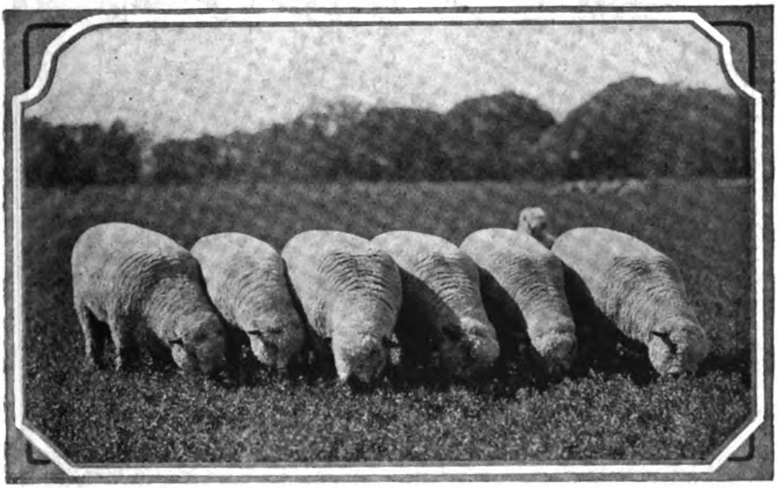
Group of Kentucky horses on stock farm. Stock thrives best on the luscious grasses found in fertile pastures.

Mixtures for Acid Clay Soils Limed:

(3)	Kentucky blue grass	10 pounds
	Red top	4 pounds
	Timothy	6 pounds
	Red clover	3 pounds
	Alsike clover	2 pounds
	White clover	1 pound
(4)	Kentucky blue grass	10 pounds
	Red top	2 pounds
	Timothy	6 pounds
	Red clover	3 pounds
	Alsike clover	2 pounds
	White clover	2 pounds

Mixtures for Clay and Loam Soils (General:)

(5)	Kentucky blue grass	8 pounds
	English rye grass	6 pounds
	Timothy	4 pounds
	Meadow fescue	2 pounds
	Alsike clover	3 pounds
	White clover	1 pound
(6)	Kentucky blue grass	10 pounds
	English rye grass	4 pounds
	Timothy	4 pounds
	Red top	4 pounds
	Red clover	2 pounds
	White clover	2 pounds



A Shropshire Sextette expressing their approval of the deep and luscious Alfalfa. V-C Fertilizers improve the crop.

(7)	Timothy	4 pounds
	Red top	4 pounds
	English rye grass	4 pounds
	Meadow fescue	3 pounds
	Alsike clover	3 pounds
	White clover	1 pound
(8)	Timothy	4 pounds
	Red top	4 pounds
	Meadow fescue	2 pounds
	Canada blue grass	8 pounds
	Alsike clover	3 pounds
	White clover	2 pounds

Rape growing between rows of corn on farm of William Waymire, Elwood, Indiana. The two crops will be hogged down.

Seeding:

If seeding is done in late summer the grasses and clovers may be seeded at one time. At seeding time the soil should contain sufficient moisture to insure good germination and a quick start. The seed may be sown with a drill, with special seeders, or by hand. The seed should be covered lightly—less than an inch deep. If the land is dry it is well to roll immediately after seeding.

The clovers may be seeded in spring, in wheat or rye, when the soil is alternately freezing and thawing or in spring after the soil is in condition to work. At the latter time the seed should be drilled or broadcasted and harrowed in. As a rule, going over the field with drill or harrow at this season will do the small grain good rather than harm.

Permanent Meadows

Permanent meadows are not very plentiful in the North Central States except in a few localities. They are usually profitable only in sections where hay sells above the average price or where some local soil conditions make the production of other general farm crops unprofitable. The hay crop is more profitable when it occupies a regular place in rotation with other crops.

The same methods of seed bed preparation, liming and fertilization given for permanent pastures may be practiced when seeding permanent meadows. But different grass mixtures should be used. For hay production only three grasses, timothy, red top and orchard grass, are generally sown, and two varieties of clover, medium red and alsike. On wet and acid soils red top and alsike clover should nearly always be used in the grass mixture as they stand such soil conditions better than the others. The total amount of seed sown per acre should usually be around twenty pounds.

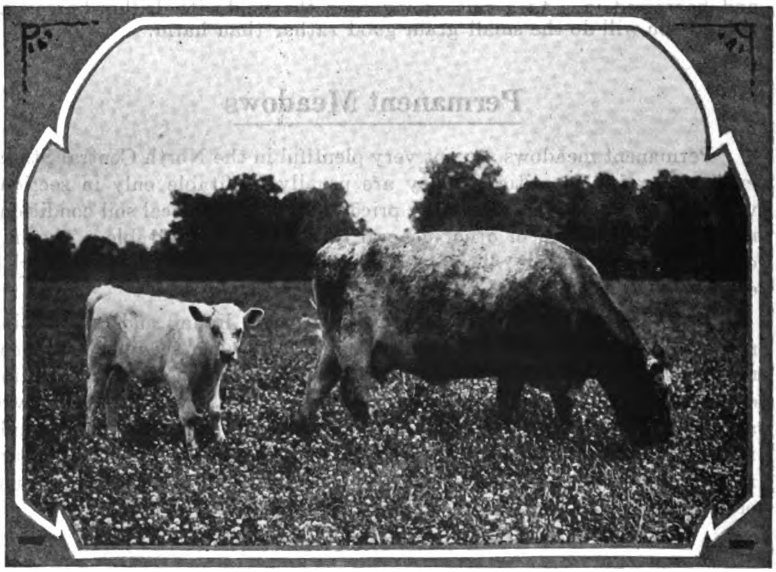
Top-Dressing Permanent Meadows

For the first two years after seeding down the meadow usually produces good crops of hay, but from that time on the hay crop gets smaller and more weedy until finally it is not worth cutting. This is due in large part to a lack of plant food. Well fertilized meadows may produce very profitable crops of hay for ten consecutive years or more. An annual top dressing with 300 or 400 pounds of V-C Top Dresser will keep the meadow thrifty if other conditions are suitable for profitable production. If the top dresser is not available a fertilizer containing 5 to 10 per cent nitrogen, 6 to 8 per cent phosphoric acid and 2 to 6 per cent potash may be applied at the rate of 200 to 400 pounds per acre. The fertilizer may be applied with grain drill, lime sower, end-gate seeder or by hand after all danger of frost has passed or when the grass is around four inches high. It should not be applied when the grass is wet with dew or rain.

Cutting and Curing

No definite rule can be followed in cutting and curing hay. As a rule, timothy should be cut about the time it is in full bloom. If cut earlier it is slightly more palatable but not so nutritious. If cut later than the bloom stage it is more woody and not so easily digested.

It should be cut in the morning after the dew is off. If the hay is very heavy it should be teddered two or three hours after being cut. In open drying weather it may be raked in two hours after teddering. The side delivery rake is especially desirable for handling grass hay, as it leaves the hay in a



Shorthorn Cow and Calf grazing on Clover. Fertile and abundant pasturage will produce good healthy stock. V-C Fertilizers will make your pastures fertile.

loose open windrow—the best possible condition for curing. It should not be put into the mow or stack until a strongly twisted wisp shows no sign of exuding sap.

Meadows and Pastures in Rotation

In the Corn Belt fully seventy-five per cent of the meadow and pasture land is included in rotation with corn and small grain. The general practice is to sow clover, or clover and grass, with small grain as a nurse crop. If the crop is clover, all or part of it may be pastured with hogs or cattle the

first year and then turned for corn. If timothy is seeded with the clover it is usually cut for hay the first year and pastured the second, after which the sod is plowed for corn. In a few instances hay is cut for two years, after which the field is pastured for one year and the sod plowed for corn.

In sections where the land is level or gently rolling and practically all of it tillable, hay and pasture crops may be better and more profitably grown in rotation than otherwise. From the standpoint of maintaining the supply of organic matter and increasing the nitrogen supply of the soil, of keeping the soil covered a good portion of the time, of providing suitable roughage and pasturage for live stock, and of more adequately distributing farm labor, this method is highly desirable. In all of these ways, growing hay and pasture crops in rotation has the advantage over other methods of culture.

Cattle in Beef Section of Illinois grazing on Sweet Clover.

Fertilization Much Neglected

On most farms, the fertilization of hay and pasture crops in rotation is much neglected. The grain crops are frequently fertilized, but the amount applied is not sufficient to meet the requirements of the hay crop also. Hay crops, especially the grasses, require large quantities of readily available plant food.

Nitrogen is used most extensively in promoting growth. A rank growth and a dark green color always indicate a full supply of available nitrogen. Where the plants are weak and yellow an application of nitrogenous fertilizer is greatly needed and should be given for best results.

Phosphoric acid hastens maturity, aids nitrogen in increasing yield and also assists the potash in the transfer of starch from the leaf surface to other parts of the plant. Where seed is produced, phosphoric acid is especially beneficial in forming and maturing the seed and also in increasing the yield.

The principal use of potash is in the transfer of starch from the leaf surface to other parts of the plant and in stiffening the stalk. These functions seem trivial but are highly important when the complex system of plant nutrition is considered.

Cutting Clover, Purdue University Farm, Lafayette, Ind.

Sowing Clover Seed in Winter Wheat, Purdue Farm, W. Lafayette, Ind.

Hulling Clover Seed. The Liberal Use of V-C Fertilizer Increases the Yield of Both Hay and Seed.

Common Red Clover, Tippecanoe, Co., Indiana. Use V. C.

Applying Fertilizer For Hay Crops in Rotation

If only one crop of hay is to be harvested, especially when the grass mixture is half clover, all of the fertilizer needed may be economically applied to the small grain crop with which it is seeded. In such cases 300 to 500 pounds per acre of a fertilizer containing 2 to 3 per cent nitrogen, 8 to 12 per cent of phosphoric acid and 2 to 4 per cent of potash may be used on clay and loam soils. If the crop residues, wheat straw, corn stalks, etc., are fed on the farm or are left or spread on the fields the potash may be

The Heir-Apparent doing his bit by helping to bring in the Harvest. In later years he will realize that high grade Commercial Fertilizers assure a bountiful harvest. V-C is best for all grasses and pastures.

left out of the fertilizer. On very fertile soil or where manure has been applied for wheat the nitrogen may be left out or considerably reduced.

For black sandy and muck soils the nitrogen may be omitted and the per cent of potash doubled or trebled.

The Clovers

There are few families of plants that are economically more important than the legumes. They have one distinctly important character not possessed by any other group of plants—the power of gathering nitrogen from the inexhaustible supply in the air. It is for this reason that they are so highly esteemed by the best farmers.

Note the Number and Size of the Shocks in This Field.

Every Head Up Like a Regiment of Soldiers.

These Three Views of Crimson Clover are from the Farm of James Bellwood, Stop 24 Richmond-Petersburg (Va.) Electric Car Line, Who is a User of V-C.

The roots of these plants, under favorable conditions, have small wart-like nodules on their roots which are filled with millions of bacteria which possess the power of extracting free nitrogen from the air and giving it to the plant. This nitrogen is used by the plant in making growth. Many have wondered why the small bacteria so faithfully perform what appears to be a gratuitous task. While the plant receives great benefit from the bacteria, the bacteria are receiving sugars and starches—their food—from the plant. It is one of Nature's striking illustrations of the value of close co-operation. The importance of this class of plants is shown by the fact that man's existence in the world would not be possible without them. Nitrogen lost through combustion could not be recovered in sufficient quantity and cheaply enough to make agriculture self-sustaining. Since nitrogen is the most expensive element of plant food, and can not profitably be bought in sufficient quantity to meet the requirements of crops, every possible means of securing it cheaply should be fully utilized. The culture and utilization of legumes on the farm is the cheapest way of getting nitrogen yet discovered.

Cutting a bumper crop of Clover on an Illinois Farm. Modern farming methods coupled with V-C Fertilizers produce bumper crops.

Have High Feeding Value:

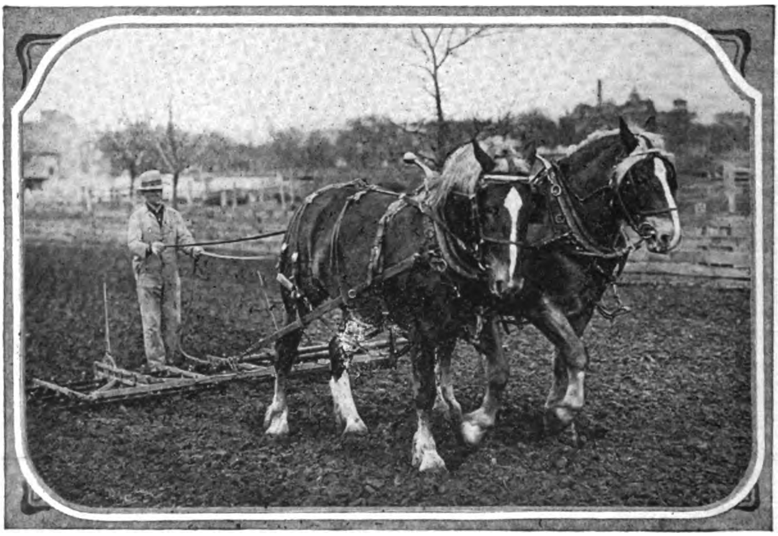
On account of their high nitrogen (protein) content the clovers are very valuable for feed. Hay from few other crops is more valuable than clover hay. It may be advantageously used for feeding all kinds of live-stock. It aids materially in balancing carbonaceous rations of corn, small grains and non-leguminous hays.

The clovers are also used extensively for pasture—especially for hogs, fattening cattle and for dairy cows. Abundant cheap, nutritious and palatable pasturage is essential if pork, milk and beef are produced cheaply. It is for this reason that clover pasture is highly desired by livestock farmers.

Are Soil Building Crops:

Clovers are grown for hay, pasturage and soil improvement. They serve these three purposes admirably and much better than any other crops. For soil improvement, the clovers—red, mammoth, sweet and alsike—are first in importance. No other crops can be grown so easily and cheaply that furnish so much value in feed and in soil improvement.

A two ton crop of clover contains 84 pounds of nitrogen, 17 pounds of phosphoric acid and 84 pounds of potash. The roots and stubble of such a crop contains about 42 pounds of nitrogen. It is generally estimated that one-third of the total weight of a crop, tops and roots, is in the stubble and roots. Scientists claim that even under very favorable conditions clover does not gather more than three-fourths of its nitrogen from the air—it

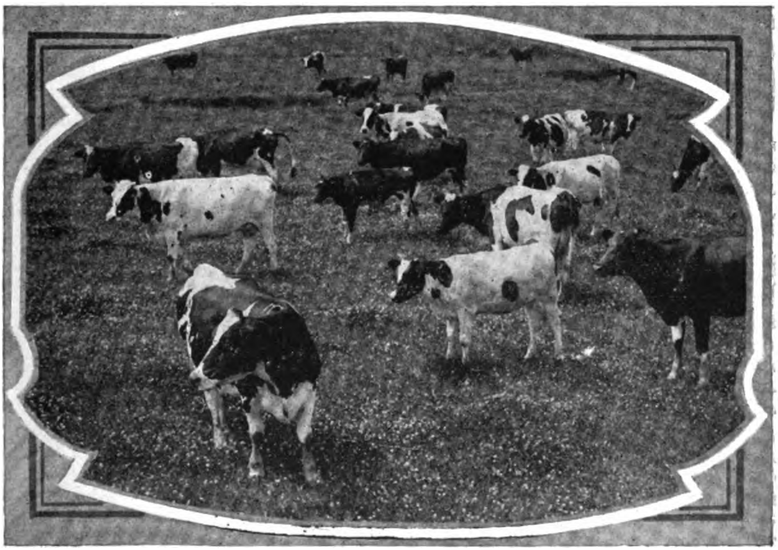


Pure Bred Belgian Mares dragging a Spiked Tooth Harrow preparing seed bed for forage crop. Proper soil preparation and abundant fertility always assure the maximum yield from the soil.

takes the other one-fourth from the soil. On soils that are acid and not properly limed and fertilized, clover gathers less nitrogen, in many cases not more than one-half the total amount it uses. One can readily see from these facts that clover does not increase the nitrogen supply of the soil when all of the top growth is removed. To improve the soil by growing clover, some of the top growth must be left on the land or the crop fed and the resultant manure carefully conserved and returned to the soil. If a large portion of the top growth (say the second crop) is turned under, the soil will be much improved. If a thrifty growth of second crop clover is turned under once every three or four years, accompanied by other good farming methods, including proper fertilization, the supply of organic matter and nitrogen may be maintained at a high level and the point of maximum economic production may be attained.

Are Heavy Feeding Crops:

While clover is a nitrogen gathering and a humus restoring crop, it requires a large quantity of mineral plant food. The amount of nitrogen it assimilates from the air depends to a large extent upon how the crop is fertilized. It must have lime, phosphoric acid and potash in sufficient quantity to meet its needs. There are many cases in which the production of clover is of little or no value because lime and phosphoric acid are not present in sufficient quantity. For securing permanent benefit these requirements must be met. When that is done the production of clover will be of untold value to the soil.



Who said Milking Time? Prize Cattle on Ohio Dairy Farm.

Seed Bed Preparation

Little can be appropriately said about seed bed preparation for the reason that fully nine-tenths of the clover crop is seeded with small grain as a nurse crop. When the soil has been well fertilized and the seed bed for small grain properly prepared, this method of seeding is both cheap and efficient. The importance of the seed bed for wheat and rye being thoroughly prepared, can not be too strongly emphasized.

Sod and stubble land should be plowed early, disked, rolled and harrowed as frequently as necessary to prepare a deep, fine and well compacted seed bed. Small grains do not do well in loose open soil. The same can be said about preparing the seed bed for clover where it is to be seeded alone. It must have a suitable place to root and start growth. (See booklet on Small Grain Production.)

The preparation of the seed bed for oats is very frequently insufficient for securing a good stand and growth of clover. If the land is only single cut with disk, white-top and other weeds are likely to be quite thick in the clover. This not only reduces the crop, but injures the quality of the hay. The writer has seen fields in which the quality of hay was reduced one-half on account of weeds, most of which might have been eliminated by thoroughly preparing the seed bed for the small grain crop. For oats the soil should be thoroughy double disked or plowed and then harrowed. Thorough preparation of the soil and good fertilization are two prime essentials in securing good crops of clover. They are also very beneficial for oats, therefore, thorough preparation of the seed bed for oats serves a two-fold purpose.

Lime Frequently Needed

The value of lime for increasing crop yields is just beginning to be appreciated. Soil acidity is responsible for clover failing on thousands of acres. It is undoubtedly responsible for many clover failures in the Corn Belt. Therefore, the main object of liming is to neutralize soil acidity so that clover and other legumes will thrive.

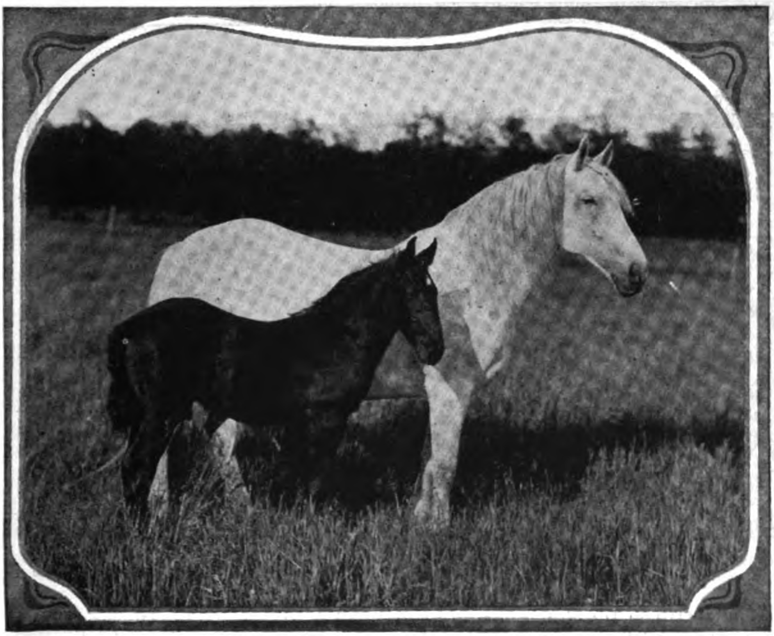
It has frequently been stated that the bacteria which live in the nodules on the roots of clover will not develop in an acid soil. This is a mistake. They develop rapidly in a slightly acid soil, but only feebly in a soil having a lime requirement (calcium carbonate requirement) above 1,500 pounds per acre. It may also be stated that the lime requirement point at which they refuse to develop well depends upon the kind of soil and the way it has been treated. Clover is more tolerant of acid on a clay or silt loam soil than on a sandy soil; also more tolerant on a soil well supplied with organic matter than on one deficient in this constituent.

In Northern and Eastern Ohio, Northern and Southern Indiana and Southern Illinois, as well as in many other similar sections, the use of two to four tons of finely ground limestone to the acre frequently more than doubles the clover crop. In many cases its use makes the difference between good clover and practically no clover. The Indiana and Illinois Experiment Stations have fields on which the use of lime has given returns of three and four dollars for each dollar invested. On some of these fields an application of limestone has more than doubled the crop of clover hay. Under such conditions no farmer can afford not to apply limestone freely.

Ground limestone, burned lime, hydrated lime, marl and ground shells are all used effectively for correcting soil acidity and increasing crop yields. Ground limestone, ground shells and marl are usually the cheapest forms of lime to use. Two, to two and one-half times as much of these should be applied per acre as of the burned, unslaked lime. As a rule, two to four tons of the ground limestone should be applied per acre after the land is plowed so that the limestone may be mixed with the surface soil by the subsequent harrowings. It may be applied in preparation for small grain, corn, or in preparation for seeding clover alone. Lime is also applied as a top dressing to clover during the first eight months after seeding. In many sections marl containing 80 per cent or more of calcium carbonate may be obtained cheaply and may frequently be used to good advantage. It is usually found in old lake beds and under deposits of one to six feet of muck soil.

Fertilizer Increases the Yield

Fertilizer is as beneficial to clover as most other farm crops. Under suitable soil conditions (land well supplied with lime and properly drained) clover will gather its own nitrogen, but responds well to phosphate fertilization. Many soils have become so deficient in available phosphoric acid that a good crop of clover can not be obtained without fertilization. In such instances the small grain with which the clover is seeded should be fertilized, or if usually fertilized, should be fertilized heavier. Not many



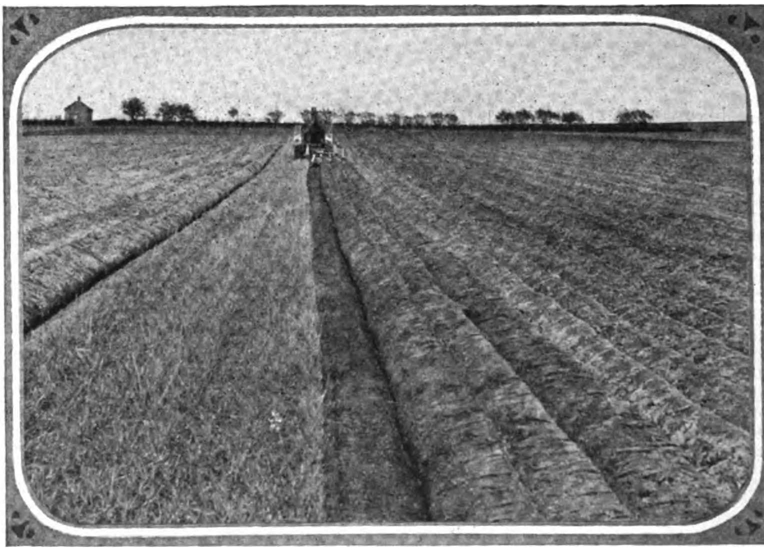
Prize Percheron Mare and Colt. The ideal type of horse for heavy farm duty.

of the clay and loam soils of the Corn Belt region will need more than a small amount of potash fertilization, if any at all, but heavy applications of V-C acid phosphate are highly profitable. Potash is needed on the muck, black sand, and light colored sandy soils.

On some of the thinner clay and silt loam soils the application of 400 to 600 pounds of acid phosphate to the acre on small grain has increased the yield of clover following more than a ton per acre. When clover is seeded alone it should be well fertilized so it will have opportunity to make a good growth.

The Value of Fertilizer

Fertilizer applied for clover serves a double purpose; it gives an increased growth of clover and the increased growth improves the soil more. This is true if the first crop is cut for hay and only the second crop is left on the land. With lime, phosphoric acid, potash and inoculation present in sufficient quantity, clover will make a vigorous growth on soil too poor to grow satisfactory grain crops. After a good crop of clover is grown the grain crops will thrive. Without these essential constituents clover can not grow and progressive farmers are careful to see that those in which the soil are deficient are supplied.



The last word in Plowing. The farm tractor is rapidly coming into favor among all progressive farmers throughout the country.

The fertilizer for clover should be drilled broadcast, during the preparation of the seed bed or at the time of seeding. If the seed is sown in spring on winter grain, the fertilizer should be applied for small grain. The fertilizer may be applied with fertilizer attachment of grain drill, with lime sower or by hand. If drill or lime sower is used the machine should be watched for the purpose of keeping all the drills working.

Inoculating the Seed

In sections where clover is regularly grown inoculation is usually unnecessary, as the bacteria are likely to be present in large numbers. In sections where clover is not usually grown and where most of the soils are

too acid to produce good clover without liming, inoculation is desirable and very beneficial.

The seed may be inoculated with pure cultures of bacteria or with soil taken from immediately around well inoculated plants. Pure cultures may be obtained from U. S. Department of Agriculture, from some seed firms and from special manufacturers. The directions accompanying the bacteria should be carefully followed. If the seed are inoculated with soil they should be slightly moistened with a week glue solution made by dissolving a ten cent can of glue in hot water. Then thoroughly mix the inoculating soil and seed and dry in the shade. The seed may then be sown as usual. Inoculated seed should be covered in fifteen minutes after spreading, as one-half hour of hot sunshine will kill the inoculating bacteria. Inoculation may also be accomplished by spreading 200 to 500 pounds of inoculating soil per acre.

Sowing the Seed

When buying seed the best is none too good. It is advisable to get seed of tested germination and with a guaranteed purity. A sample of the seed should be sent to your State Experiment Station for purity analysis and germination test. The most reliable seedsmen are always willing to sell, subject to test or with a guarantee. Good seed, like good fertilizer, is always the cheapest.

The seed may be drilled with special small seed drill, with broadcast seeders or sown by hand. The value of the special small seed drill is being more and more appreciated. It distributes the seed regularly over the soil and at a uniform depth. This gives a more uniform stand of grass over all the field than can be secured by other methods, and at the same time the total amount of seed sown may be reduced one-fourth or more. In using this drill on fresh prepared land one should be careful not to get the seed covered too deeply.

During February and March there are usually many days when the ground is alternately freezing and thawing, when the "honey comb" conditions of the soil makes it very suitable for sowing clover seed. Many good stands are obtained from seed sown under such conditions, but many seed are sown and left on the surface under conditions quite unfavorable for obtaining a good stand. This is an unwise practice. If the conditions are not favorable for getting a stand it is better to wait until spring when the soils is in condition to work and then drill the seed or broadcast and harrow it in. No matter what method of seeding is practiced, care should be taken to see that the seed is uniformly distributed.

The broadcast method of seeding is frequently practiced. The seed may be sown after the land is dry enough to harrow and the field gone over with spike-tooth harrow or weeder to cover the seed. This is frequently a better method to follow than to sow under unfavorable conditions and trust the weather to cover the seed.

Clipping and Pasturing Stubble Fields

After the small grain is cut there is nearly always a crop of rag weed and other annual or biennial weeds that come up in the clover or mixed hay field and make a vigorous growth. Much can be done toward reducing this weed growth by mowing the weeds before they produce seed. Best results may be secured by mowing the latter part of August. The clover or clover and grass will then make a vigorous growth before killing frosts come and this growth and the weed and stubble clippings will furnish much protection during the winter. The weeds will also decay sufficiently to be out of the way at hay harvest the next year. This will not be the case if the weeds are left to stand and as a consequence the hay will not be so desirable.

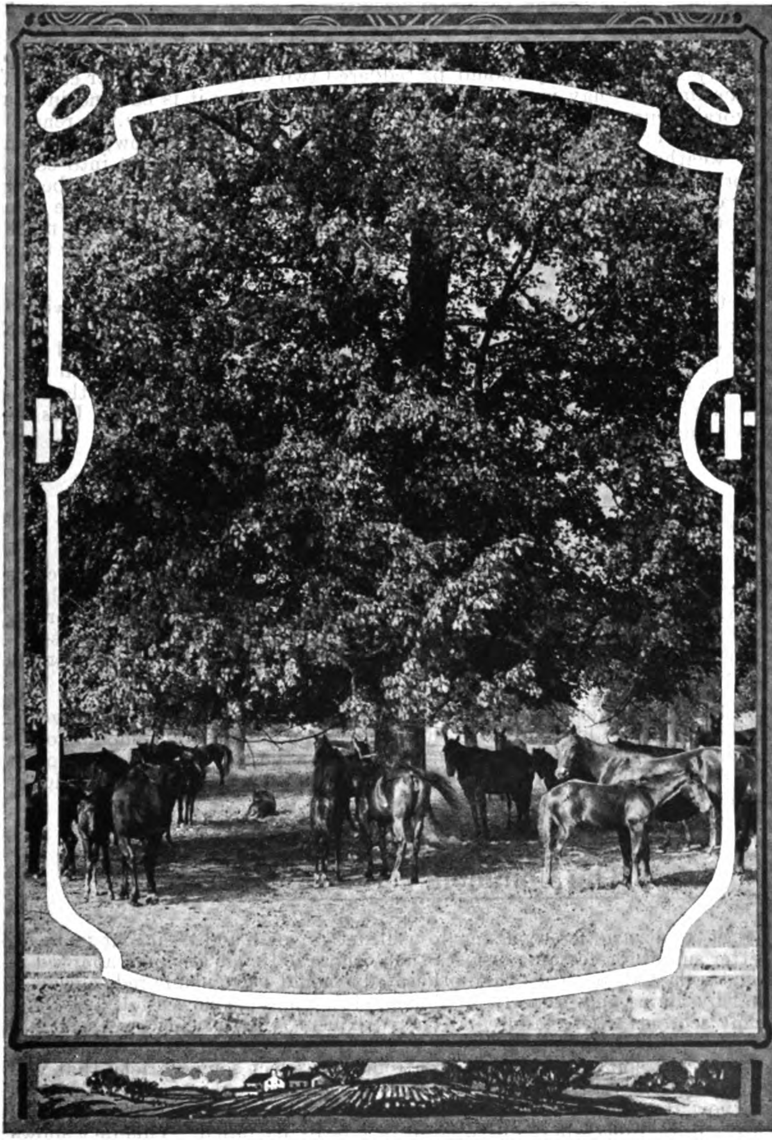
It is often advisable to pasture the clover after the small grain is harvested, but stock are frequently turned on too early. Too early or too heavy grazing prevents the plants from getting well rooted and reduces the next year's crop. When pasturing is practiced it is advisable to remove the stock in time for the clover to get four to six inches high before it is frosted down. This practice is seldom followed, but like good fertilization it pays.

A splendid team, modern methods and Fertilization, always produces bumper crop yields.

Harvesting and Curing

Full bloom is usually considered the best time to cut clover for hay. When sown with timothy, cutting is sometimes delayed for one to two weeks. but the quality of the clover hay is considerably lessened thereby. Clover is more easily cured when cut after than at the full bloom stage because it contains less moisture. If the weather is unfavorable for curing it is frequently advisable to delay cutting a few days.

No definite rule can be laid down or followed in cutting and curing hay. Much depends upon the weather and good judgment must be exercised as to time of cutting, time and method of curing and condition of the hay when housed or stacked.



Where Pedigreed Kentucky stock comes from. The famous "Harvester" 2.01 probably sought shade under this very same tree. The view is on the Walnut Hill Farm, Kentucky.

Clover, like other hays, should be cut when the dew is off. If the crop is very heavy the hay should be teddered two to four hours after cutting. Sometimes the hay may be windrowed the same day it is cut and in less favorable curing weather it should be left until the following day. In reasonably cool breezy weather, clover may be cured in the windrow, but when the weather is hot and dry less leaves will be lost if it is put into cocks shortly after windrowing. This method may also be followed to better advantage when the weather is threatening. Clover will turn some rain but the use of hay caps makes the curing of clover and alfalfa hay much safer. They are not very expensive and frequently save enough to pay their cost in one season.

Clover should not be put into the mow or stack until a strongly twisted wisp shows no sign of exuding moisture. It should also not be wet with dew or rain. If put up too green or very moist with dew or rain it will heat and turn brown and sometimes mould badly. Some farmers claim that hay which has heated and turned brown is relished more by cattle than hay having a good green color and that it is also just as nutritious. It is not advisable, however, to feed such hay to horses.

Pasturing Clover

The clovers are grazed extensively and there are few pasture crops that give better results. They are especially suited for grazing hogs, young stock, and milk cows. Medium red and alsike are best suited for hog pasture and sweet clover and red clover for pasturing cattle. In most instances the best cattle pasture may be obtained by sowing timothy or red top with the clover.

It is not advisable to turn the stock into the field before the clover is four to six inches high. During the summer and fall the stock should not be permitted to graze so close to the ground that the clover is killed. Do not pasture too closely at any time and leave a four-inch growth on the field for a winter cover.

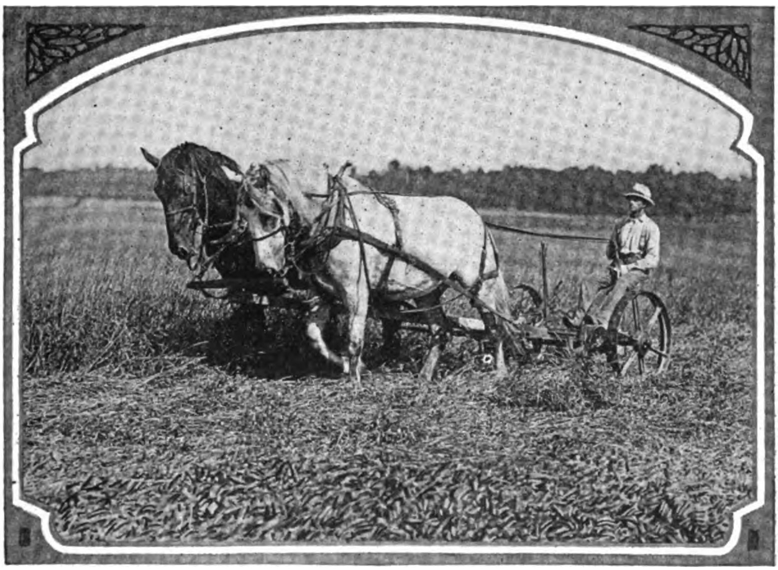
The Common Varieties of Clover

Several varieties of clover do well in the North and West, but some are better suited for certain purposes than others and some are more adapted to some soils and localities than others. It should be remembered, however, that by liming and properly fertilizing, clover may be successfully grown in many sections where failures are now frequent. Many soils are especially deficient in lime and phosphoric acid and in such cases it is more important to treat the soil properly than to attempt to select some variety that will grow under present conditions. Lime, inoculation and proper fertilization are now responsible for excellent stands of alfalfa, sweet clover and red clover in sections where all three have repeatedly failed. This fact shows that proper soil treatment is fundamental no matter what variety of clover is grown.

Red Clover

This variety of clover is grown more extensively than any other. When grown in regular rotations for the combined purpose of producing hay and improving the soil it is superior to other varieties under normal soil conditions. Under favorable conditions it produces two to three tons of cured hay per acre and the second crop would frequently make a ton of hay to the acre. The seed crop ranges from nothing to six bushels to the acre and averages around two bushels.

A bushel of seed weighs 60 pounds and will seed 6 to 9 acres. The seed are usually sown in late winter or early spring, with small grain, but may be sown alone in late summer. When sown with small grain it is not cut for hay the first year, but one crop of hay and a seed crop or a crop to turn under is obtained the following year. It is seeded alone and also in mixtures with timothy and other grasses. It grows best on the heavier types of soil that are well supplied with lime.



Cutting Clover and Timothy Hay on the farm of Miller and Son, Mulberry, Indiana. Good soil and abundant applications of V-C Fertilizers will bring high yields of clover and timothy.

Mammoth or Big English Clover

This clover makes a heavier and a ranker growth than red clover and the first cutting will usually make more hay per acre. Almost no second crop is obtained as new growth does not start from the crowns of the plant, but from green buds on the stalks or stubble. It must be cut early and high if a second crop is desired. The seed weigh 60 pounds per bushel and can not be distinguished from red clover seed. It is grown principally for soil improvement and for seed, but is sometimes cut for hay.

Alsike Clover

Alsike clover does not grow so tall or heavy as the red clover. It is adapted to a wide variety of soils and climatic conditions. It grows well in cool moist climates and withstands severe winter freezing and also hot dry weather better than red clover. It grows quite well in waterlogged soil and does not appear to be affected by "clover sickness." It grows quite well on soils too acid to produce good red clover.

This clover is not a biennial as most clovers but a long lived perennial. On good land it frequently lives 4 to 6 years. It is well adapted to growing in pasture mixtures and hay mixtures that are to be pastured after being mown for hay one year. Many farmers like to sow a mixture of two parts red clover and one part alsike alone or with timothy for hay. It should be cut when in full bloom. The hay and green clover are both eaten greedily by stock, but when pasturing with sheep and cattle precautions should be taken to prevent bloating.

Sweet Clover

Sweet clover has the general appearance of alfalfa, especially when small. It has so long been considered a weed that many farmers have hesitated to sow it as a farm crop. It is not a weed. It is grown for hay, soil improvement, pasturing and for seed. As a hay and pasture crop it will not likely take the place of red clover and alfalfa, but it may be used for this purpose where other legumes can not be successfully grown. Its greatest usefulness is as a soil improver. Its ability to grow on soil very deficient in organic matter, in waste places and on eroded hillsides when sufficient lime is present should encourage its culture.

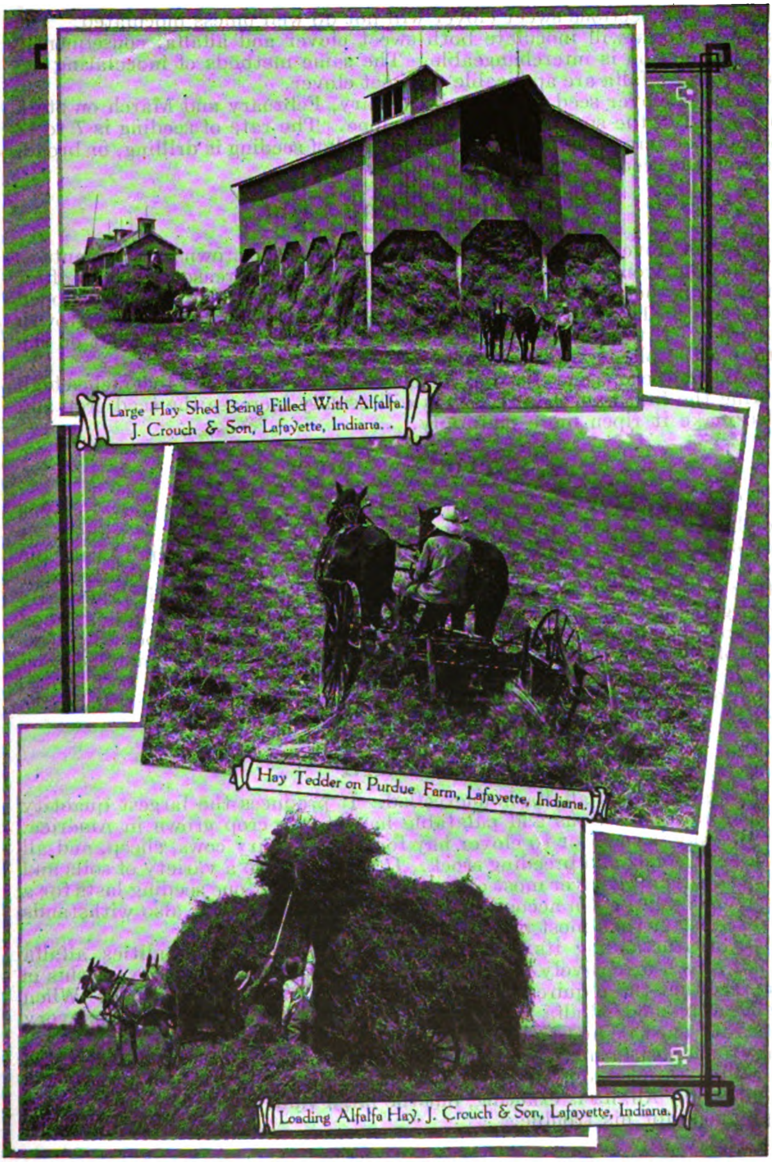
There are several species of sweet clover but only two, the common white biennial sweet clover (Melilotus alba) and the large yellow biennial sweet clover (Melilotus officinalis) are of agricultural importance. The white variety grows larger and is usually preferred for most purposes, but some farmers prefer the large yellow species for hay.

Sweet clover grows best on limestone soil, but will grow well on badly depleted soil if lime and available phosphoric acid are abundantly supplied. Because it grows so well on depleted soil when lime and phosphoric acid fertilization are supplied, it is one of the best soil improving crops that may be grown.

Sweet clover does best on a well compacted seed bed, with just enough loose surface soil to permit the seed to be covered easily. It may be sown on stalk land, winter grain fields, in the spring with oats, or alone in late summer, winter or early spring on land which has been prepared long enough for the seed bed to be well firmed.

Fertilizing

All acid soil should receive 2 to 4 tons of limestone to the acre beofre being seeded to sweet clover. Even when this is done the growth will be small on thin soil unless the crop is also fertilized. Each acre should receive 300 to 500 pounds of high grade V-C Acid Phosphate to the acre. Such fertilization will more than double the growth of sweet clover on thin soil.



Large Hay Shed Being Filled With Alfalfa. J. Crouch & Son, Lafayette, Indiana.

Hay Tedder on Purdue Farm, Lafayette, Indiana.

Loading Alfalfa Hay, J. Crouch & Son, Lafayette, Indiana.

Inoculating and Seeding

In most sections sweet clover will not do well unless inoculated. The same bacteria will inoculate both sweet clover and alfalfa; consequently the inoculation is interchangeable. The same methods of inoculating described for alfalfa are applicable to sweet clover.

Sweet clover seed are sown in January, February and March on stalk fields and in the spring with oats or alone. The rate of seeding is 7 to 12 pounds per acre. The most reliable method of seeding is drilling, or broadcasting the seed and then harrowing them in.

Handling the Crop

Sweet clover does not start new growth from the crowns of the plants as alfalfa, but from green buds on the stems. For this reason when the first crop is cut the second year a long stubble must be left or the crop clipped very early. This is especially true when the stand is thick and the growth vigorous. If the plants are cut so close that no green buds are left on the stubble the plants will die.

When a seed crop is desired the crop should be clipped 4 to 6 inches high during the first half of May. This will usually increase the seed crop and also make it ripen more uniformly.

Japanese Clover

This clover is not adapted to sections farther north than 50 to 75 miles north of the Ohio river. In the northern part of the section to which it is adapted it does not produce seed in a short season. It is especially valuable for sowing in pastures on thin land and for soil improvement. Unlike most other clovers it will grow on very acid soil and where there is practically no organic matter in the soil. However, it responds well to liming, good soil and good fertilization. Experiments have shown that a liberal application of acid phosphate frequently doubles the yield. The unhulled seed weigh 25 pounds to the bushel and one bushel of seed should be sown to three acres. It is an annual and must be seeded each year or allowed to reseed itself.

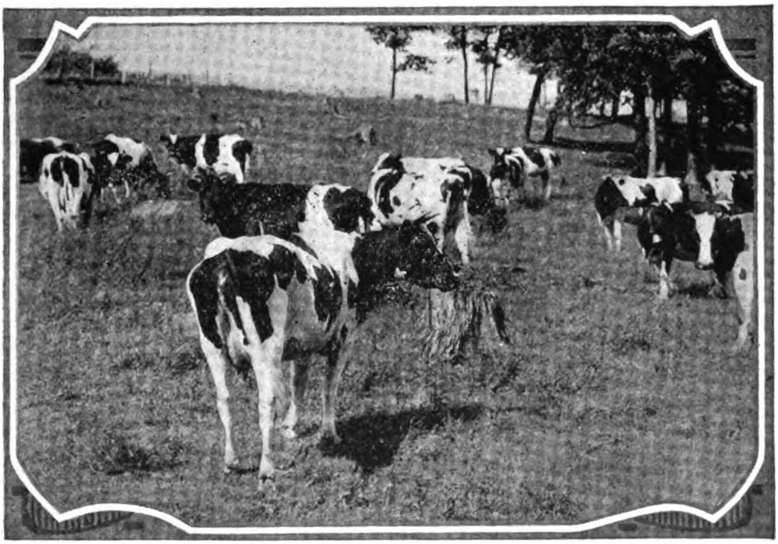
Alfalfa

As a hay crop alfalfa is unexcelled. It produces the largest quantity of the most nutritious and palatable hay of any crop grown in America. Alfalfa hay is superior to clover hay for feeding dairy cows, sheep, and all classes of young and breeding stock. It is adapted to a variety of soils and has the advantage over most other hay crops in that one seeding lasts for a number of years. On account of its deep rooting habit, it also withstands drouth better than most other crops.

Notwithstanding its many advantages and excellent qualities, alfalfa is not grown extensively in many sections. The primary reason for this is the fact that the requirements of the crop are not well understood. When well established, alfalfa is a very hardy plant, but when young its every necessity must be met as insistently as a baby's. It is by this kind of care only that most farmers will be able to grow alfalfa successfully. One who is willing to meet only a part of its requirements had better grow some other crop. Alfalfa is exacting, but the large value of the crop abundantly repays one for his trouble.

Soils Adapted to Alfalfa

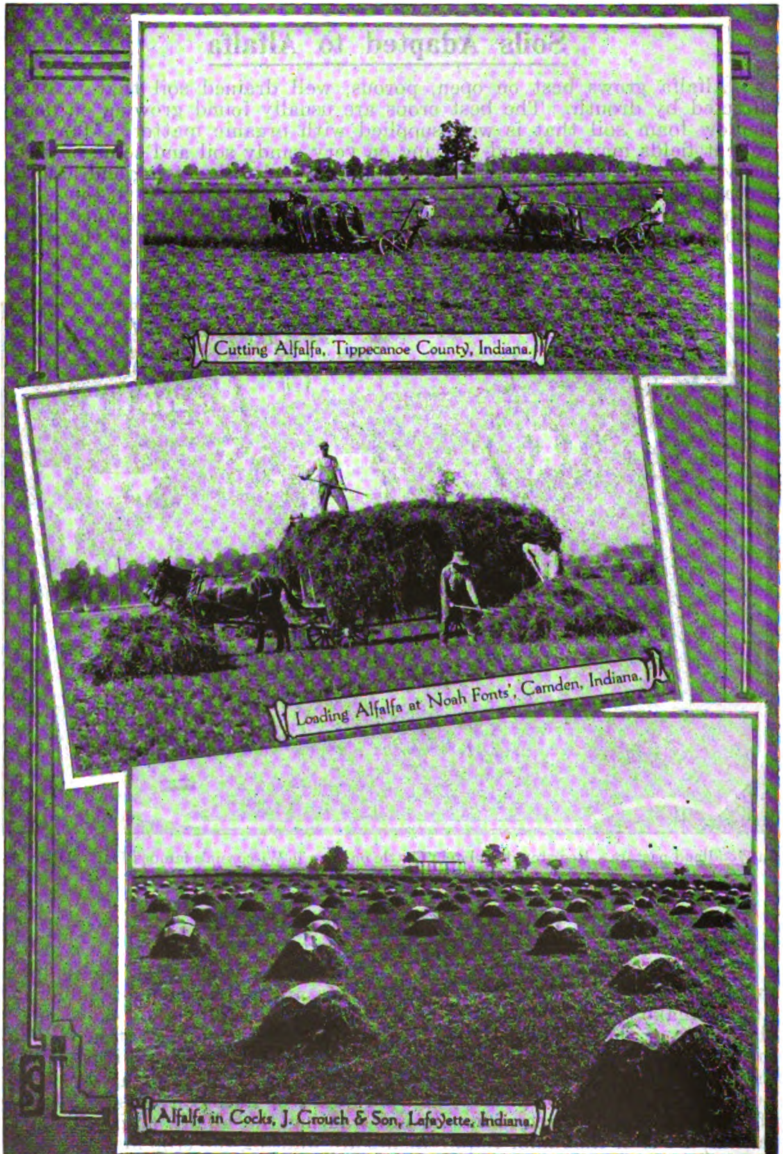
Alfalfa grows best on open, porous, well drained soil that is little affected by drouth. The best crops are usually found growing on deep, mellow loam soil that is well supplied with organic matter. Many excellent fields may be found growing on very sandy soil and some on very heavy clay and silt loam soils. The chief difficulty in getting and holding a stand on heavy soil is the general lack of sufficient drainage. If the soil is adequately drained, alfalfa can usually be grown successfully on most kinds of soil. It may not be feasible to attempt its culture on muck or vegetable soils.



In Woodland pasture. Registered Holstein Cattle on farm in Wisconsin's famous Dairy District.

Requirements for Alfalfa

The requirements for successful alfalfa culture may be classed as **major** and **minor.** The major requirements are good drainage, sufficient lime to make the soil slightly alkaline, enough available plant food to meet the needs of the crop and the presence of nodule-forming bacteria. The most important minor requirements are a soil well supplied with organic matter, a seed bed from which weeds have been almost eradicated, a seed bed well fined and compacted, and pure seed of hardy strains of alfalfa. If any of the major requirements are wanting the alfalfa crop will be a failure; if one of the minor requirements are wanting the crop may not be a total failure, neither will it be a total success.



Cutting Alfalfa, Tippecanoe County, Indiana.

Loading Alfalfa at Noah Fonts', Camden, Indiana.

Alfalfa in Cocks, J. Crouch & Son, Lafayette, Indiana.

Good Drainage Essential

Good drainage is very important for most crops, but more so for alfalfa. The surplus water must be removed so that air can penetrate the soil. On account of the deep rooting habit of the plant it is essential that both the soil and subsoil be adequately drained to a depth of three feet, and four feet is better. Natural drainage is preferable, but adequately tiled land produces thriving crops of alfalfa in many sections. Where the tile are laid nearer than three feet of the surface it is doubtful if alfalfa can be made a paying crop. No one need have any fear about the tile becoming stopped up with alfalfa roots, unless the tile is fed by an almost constant flowing spring.

The Need of Limestone

For successful alfalfa culture the soil must not contain any free acid. On acid soils alfalfa has a yellow color and makes a puny, weak growth. Such soils must be limed before alfalfa will thrive. An application of two to four tons of ground limestone to the acre will usually prove sufficient for most soils. On very acid soils it is best to apply a part or all of the limestone three months to one year before the alfalfa is seeded so some of the limestone will have time to dissolve and neutralize the acid condition. By so doing the young alfalfa plants will have a much better opportunity of making a strong vigorous start.

In case there is doubt as to whether or not the soil is acid it may be tested with blue litmus paper as follows: Make a ball of moist soil, break it open and insert one end of a strip of blue litmus paper and press it firmly together again; then leave for five to ten minutes. If the paper has turned pink, the soil is acid and should be limed before sowing alfalfa. If there is no trace of pink color the soil is not in need of lime. If the soil is dry it should be wet with rain water, as well water is likely to contain some lime.

Fertilizers for Alfalfa

One ton of alfalfa contains 75 pounds of limestone (calcium carbonate), 11 pounds of phosphoric acid, 42 pounds of potash and 52 pounds of nitrogen. Although alfalfa is able to gather its own nitrogen when soil conditions are suitable, it requires large quantities of mineral plant food. Limestone must not only be supplied in sufficient quantity to meet the amount removed but also to meet the amount which leaches out. This is generally estimated to range from 200 to 500 pounds per acre per annum.

A four ton crop of alfalfa takes 44 pounds of phosphoric acid from the soil. On most soils all or nearly all of that removed should be returned in the form of manures or fertilizers or both. To do this it can be readily seen that an application of about 300 pounds of 16 per cent acid phosphate will be required each year. On sandy soils and also on clay soils, when no farm manure is appplied, a fertilizer containing 2 to 6 per cent. of potash should be used. On account of the large amount of potash found in clay and loam soils only a small per cent of the potash removed by the crop need be returned to these soils.

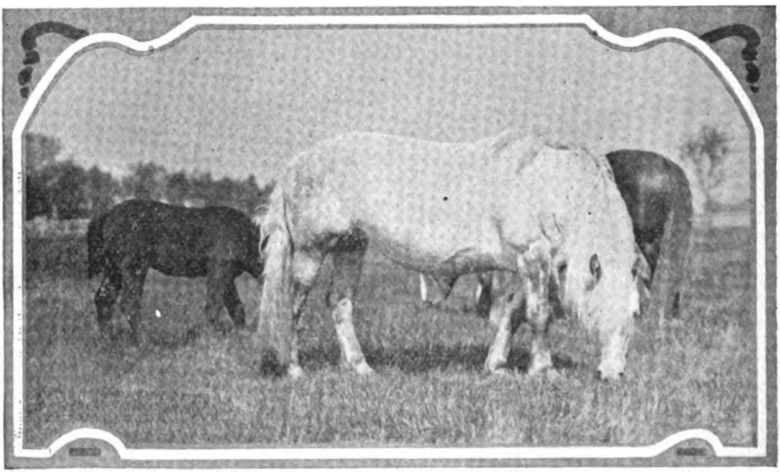
Some good alfalfa growers apply 400 to 600 pounds of high grade acid phosphate when seeding and then do not apply more fertilizer until the second season. After that the alfalfa field is top dressed with 6 to 8 tons

of manure every second or third year and those years when manure is not applied, about 300 pounds of 16 to 20 per cent acid phosphate is applied to the acre.

When seeding alfalfa on soil of medium fertility it will pay to apply 300 to 400 pounds of V-C Fertilizers containing 2 to 3 per cent nitrogen and 10 to 12 per cent phosphoric acid. The nitrogen will aid in starting the young plants to grow quickly. This is frequently very important.

Inoculation

Alfalfa requires inoculation on nearly all soils. On overflow land that is alkaline or neutral and in sections where sweet clover grows wild, inoculation is usually not beneficial. In nearly all other sections it is highly desirable. Experiments have shown increased yields of 1,000 to 2,000 pounds more hay per acre from inoculated than from uninoculated fields.



These splendid animals have thrived well on their fertile pastures.

It may be inoculated by the use of pure cultures or by the use of soil taken from well inoculated fields, or patches, of either alfalfa or sweet clover. When using pure cultures, the directions accompaning the packages should be followed. When using soil it may be drilled or broadcasted over the field at the rate of 300 to 500 pounds to the acre and immediately harrowed in. Some farmers inoculate by taking soil from immediately around well inoculated plants and mixing this with the seed. This is done successfully by moistening the seed with a glue solution, made by dissolving a ten cent can of glue in one gallon of hot water and then sprinkling and thoroughy mixing with the seed. One part of inoculating soil is then thoroughly mixed with two parts of seed and the mixture dried in the shade. The seed is then ready to sow.

Value of Organic Matter

Alfalfa is seeded with the expectation that it will occupy the land for several years. The supply of moisture can not be held by cultivation; it must be held by the supply of organic matter in the soil. Bacterial activity and the supply of available plant food also are controlled to a large extent by the supply of organic matter present in the soil. For these reasons some means of supplying organic matter to thin soils should be adopted.

The addition of organic matter is especially important on the heavier types of soil. An application of 8 to 10 tons of barnyard manure to the acre is very desirable. In its absence a crop of soybeans, cowpeas, rye or some other green manure crop should be turned under. Any green crop should be turned under long enough for the vegetable matter to pass through the first processes of decay before seeding.

Preparation of Seed Bed

When seeding alfalfa in the spring it is advisable to select land which was planted to a tilled crop the previous year. In most cases such land need not be plowed. Thorough disking, harrowing and rolling will usually put the seed bed in suitable condition.

If the alfalfa is to be seeded in July or August on land where weedy grasses thrive, especially foxtail and crab grass, the land should be plowed eight weeks or more before sowing time. If the soil is dry or much vegetation is on the land, disking before plowing will aid materially in preparing the seed bed. After plowing, the land should be harrowed with disk or spike-tooth every week or ten days to destroy young weeds and make the seed bed fine and firm. The roller or plank drag should also be used as frequently as necessary to pulverize the soil and make it firm. It should be remembered that alfalfa makes a feeble growth on a loose, open seed bed. Thorough preparation costs more but pays in the end.

At the time of seeding the seed bed should be thoroughly fined and compacted throughout except an inch or two of loose soil on the surface. It should also be moist enough to germinate the seed well.

Seeding Alfalfa

Alfalfa seed should be sown at the rate of 10 to 15 pounds to the acre depending on the condition of the seed bed and the kind of alfalfa sown. On a thoroughly prepared seed bed that is moist 10 pounds of a hardy northwestern grown alfalfa seed is sufficient. Alfalfa should generally be seeded in spring in the northern third of the Corn Belt and further north. In the southern two-thirds of the Corn Belt late summer seeding on soil that has been fallowed is preferable.

Alfalfa seed may be drilled with special clover seed drill, with grain drill, or with broadcast seeders and the seed harrowed in. The use of the special clover seed drill is most desirable where the seed bed is well firmed. On a loose seed bed it is almost impossible to keep from putting in the seed too deeply with this machine. No matter what method of seeding is practiced the seed should not be covered more than an inch. If the soil is thoroughly moist one-half inch is deep enough to plant the seed. When using the broadcast method of seeding it is advisable to divide the seed and sow over the land twice going in opposite directions across the field. This insures a more uniform distribution of the seed.

Cutting and Curing Alfalfa

Alfalfa should not be cut before new growth puts out from the crowns of the plants. As a rule this new growth should be one to two inches long. The hay is less washy when left to stand reasonably long before being cut. This should be remembered when the hay is to be fed to horses.

No definite rule can be given for making hay, because the curing process depends on the weather. In warm bright weather hay that is cut in the morning after most of the dew is off will be ready to ted by eleven o'clock and ready to rake in the windrow by two o'clock. For raking, the side-delivery rake is more preferable to the dump rake. The hay is windrowed more loosely and cures better when the side-delivery rake is used.

Cutting the second crop of Alfalfa on the same land. Results like this bear out the statement that fertile soil is the farmers' best asset.

In hot weather the hay may be put in cocks four feet high and three to four feet across, late in the afternoon the day it is cut. In ordinary open weather the hay should not be piled until the second day. The hay is generally left in the cocks three to six days before being put in the mow. It should not be put into the mow until a twisted wisp shows practically no sign of exuding sap, nor when moist with dew or rain.

In warm, but not hot, dry weather alfalfa may be satisfactorily cured in the windrow. In hot weather this method of curing is responsible for the loss of a large per cent of the leaves. This should be avoided as much as possible no matter what method of curing is practiced.

Alfalfa may be cut three times in a season and sometimes four. It should never be cut so late that a growth of six inches will not be made before the first killing frost. This much growth is necessary to protect the plants during winter. If the fourth crop gets a foot or more high it may be pastured for a couple of weeks. Stock should not be allowed to graze it too closely.

Care of the Alfalfa Field

Many alfalfa fields are made unfit for mowing in two to three years because they are not properly handled. The accumulation of weedy grasses frequently chokes out a considerable portion of the alfalfa. This may be avoided to a large extent by harrowing the field thoroughly once each year. The special spring-tooth alfalfa harrow gives most satisfactory results. The ordinary spring-tooth harrow is used also. The disk is sometimes used and then the field is cross-harrowed with spring-tooth or spike-tooth harrow. When the disk is used it should not be set to cut very large furrows.

Sheep on Rape field of Purdue University, Lafayette, Indiana.

In most instances the field should be harrowed just after the first or second cutting of hay is made. Some farmers harrow before growth starts in spring, but usually the land is too wet early in the spring.

Applying Fertilizer

A top dressing of V-C Acid Phosphate or a fertilizer containing 8 to 12 per cent phosphoric acid and 2 to 6 per cent of potash is advisable. The fertilizer may be applied with fertilizer attachment of grain drill, with fertilizer or lime sower, or by hand. When the drill is used it may take the place of a cross harrowing.

If the alfalfa field is well fertilized with V-C Fertilizers and properly harrowed and cared for there is no reason why it should not last six to ten years. Many fields last longer.

A 60-Acre Field of Soy Beans on Purdue University Farm, Lafayette, Indiana.

Soy Beans in Shock. Finnis Fonts' Farm, Camden, Indiana.

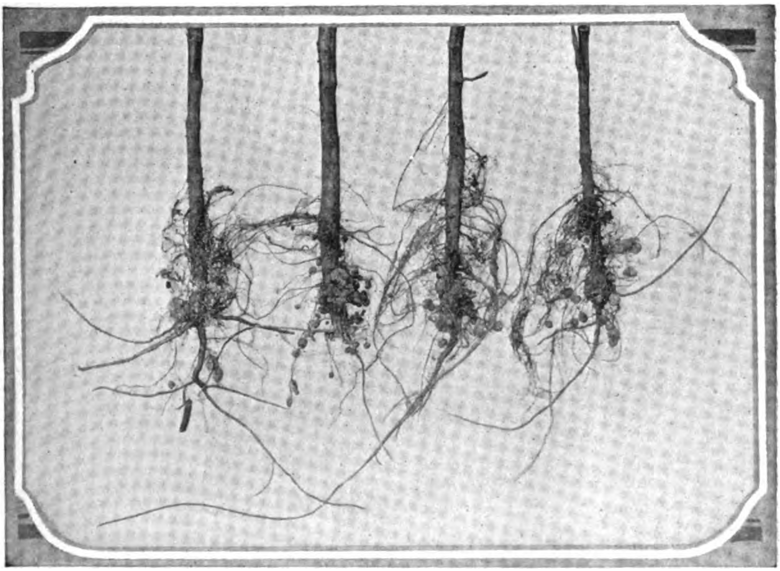
Soy Beans Being Cut with Wheat Binder on Farm of Finnis Fonts, Camden, Indiana. Wheat is Being Drilled Following Binder.

Threshing Soy Beans, Finnis Font's Farm, Camden, Indiana.

Loading Cowpea Hay, Purdue Farm, Lafayette, Indiana.

Pasturing Alfalfa

It is not advisable to pasture alfalfa the first year after seeding unless it be the last cutting and that for only a short while. Alfalfa should never be pastured with cattle, sheep or horses except for short periods. Sheep eat down the plants too closely and cattle and horses injure the stand by trampling the plants. If the field is old and blue grass has a good start pasturing one or two years, before plowing up the alfalfa, may be practiced to advantage. In such cases it matters little if the stand of alfalfa is reduced. When one wishes to mow the field for several years pasturing with sheep, horses and cattle should be avoided.



These Soy Bean Roots are well supplied with nitrogen, and aid greatly in building up the soil. V-C Fertilizers increase the root spread as well as the above ground growth.

For hogs alfalfa is the finest pasture known. It furnishes an abundance of succulent, nutritious feed that aids considerably in reducing the grain ration required. An acre of thrifty alfalfa will pasture 10 to 15 100-pound hogs all summer. If not pastured too heavily one crop of hay may also be obtained. It is not best to pasture alfalfa with hogs the first year after seeding. Even hogs should not be allowed to graze the plants too closely. The alfalfa field should never be grazed so late that a growth six inches high will not be made before the first killing frost. This is needed to protect the plants during winter.

Cowpeas

During the past ten years this crop has grown rapidly in popularity. Cowpeas belong to the legume family of plants and are grown principally as a catch crop, and on soils too acid or sandy to produce good clover. The crop is admirably adapted for these purposes, but it is not likely that it will ever occupy a prominent place in regular crop rotations. The extensive use of lime on acid soils has already reduced, if not stopped, the rapidly increasing acreage. Farmers are finding that it is cheaper in regular rotations to lime the land and grow clover than to grow cowpeas, which do not improve the soil so much. As a catch crop for hay and as a seed crop on sandy soil, cowpeas can be highly recommended. They can also be recommended as a green manure crop for poor soil.

Field of Cowpeas on land of Mr. M. G. Broaddus, Smoots, Va. Mr. Broaddus uses V-C Fertilizers and his crops bear testimony to the worth of V-C as a crop producer.

Cowpeas should not be planted until all danger of frost has passed and the weather is warm. It is a hot weather crop. While the crop will gather its own nitrogen when the soil or seed are inoculated, it should receive a liberal supply of available phosphoric acid. An application of 300 pounds of V-C Acid Phosphate will produce good returns on all except the sandy soils where the fertilizer should contain 2 to 4 per cent of potash.

Cowpeas may be sown broadcast with grain drill or by hand at the rate of 4 to 5 pecks per acre, or planted in rows 24 to 36 inches apart using 1½ to 2 pecks of seed. New Era, Whippoorwill, Groit and Early Blackeye are the varieties most adapted to the northern climate. Cowpea hay may be cured very much the same as alfalfa, except it requires more time to cure.

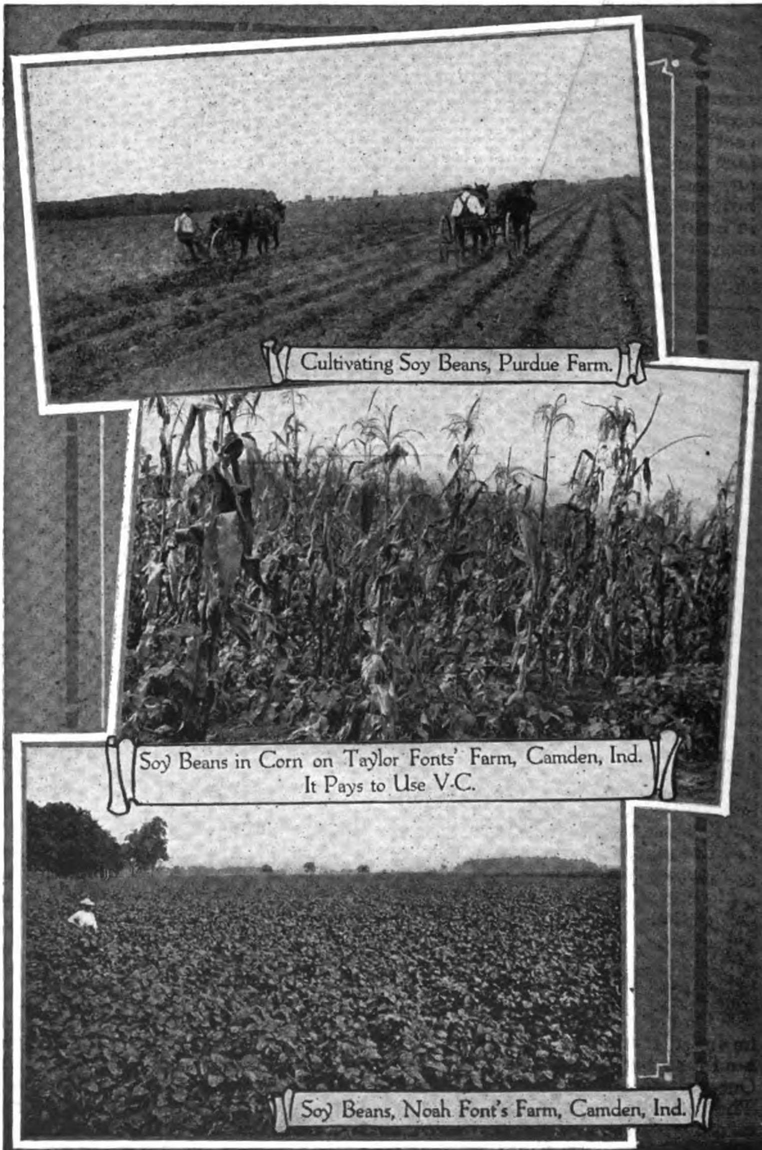
Soybeans

The value and almost universal favor of this crop is shown by the rapid increase in acreage. In 1910 only a few farmers in the Corn Belt planted soybeans, but now they are grown by thousands of farmers. In many sections the crop is rapidly taking the place of cowpeas. This is due to the fact that soybeans produce as large a yield of hay of as good quality as cowpea hay, and the yield of seed, except on very sandy soil, is decidedly better. The seed is also more valuable for feed because it is much richer in both protein and fat. On this account the seed makes a valuable supplement to corn for fattening hogs.

Soy Bean Culture is rapidly gaining prominence among the progressive farmers. It is profitable for hay, seed and forage crops, and the beans are relished and profibably utilized as hog feed.

Inoculating and Planting

On soil that has not previously grown soybeans the seed or soil should be inoculated. Pure cultures may be used as described for alfalfa, or the seed may be inoculated with soil taken from around well inoculated plants. One-half to one gallon of soil is suffieient to inoculate one bushel of seed. The seed may be slightly moistened with a glue solution and then the soil mixed with the beans immediately as described for alfalfa.



Cultivating Soy Beans, Purdue Farm.

Soy Beans in Corn on Taylor Fonts' Farm, Camden, Ind.
It Pays to Use V-C.

Soy Beans, Noah Font's Farm, Camden, Ind.

The seed bed should be well prepared by early plowing and then harrowing two or three times. The seed may be sown broadcast with grain drill, planted in rows with the grain drill, by stopping up some of the holes, or planted with the corn planter. If seed is very expensive it is usually more economical to plant in rows 28 to 36 inches apart using 1½ to 2 pecks of seed per acre. When drilled broadcast 4 to 5 pecks of seed should be used. The seed should not be planted more than an inch deep except on loose open soil.

During the last few years many farmers have adopted the practice of planting soybeans in the rows with the corn at the time the corn is planted, for making silage and also for hogging down. Because of the high protein content of the beans the combination crop makes a highly satisfactory ration for fattening hogs and when hogged down the labor of harvesting is saved. For information on varieties suited for different purposes write to your State Experiment Station.

Quality Percherons on Timothy pasture of D. Augustin, Carlock, Ind. Good stock is essential to successful farming, and fertilizer essential to the production of large and profitable yields. Try V-C Fertilizers and be happy over a profitable crop.

The beans may be planted at the same time the corn is planted by getting a special bean attachment for planter, or by mixing the beans with screened soil and planting through the fertilizer distributor on the planter. The corn may be planted first and then the beans may be planted, going over the same rows a second time with the planter set shallow. The planter should be set to drop about 3 beans to each foot of row, which will require about 8 pounds of seed to the acre.

Fertilization

When grown and hogged down, or turned under, soybeans enrich the soil. For this reason the largest possible crop should be desired, especially as the larger crop adds more nitrogen and organic matter to the soil. A big crop can not be produced on soil of medium fertility without fertilizer. An application of 300 pounds of V-C Acid Phosphate will be very profitable on clay and loam soils. On sandy soil the fertilizer should contain 2 to 4 per cent of potash. On very thin soils a complete fertilizer may often be used with profit.

Millets

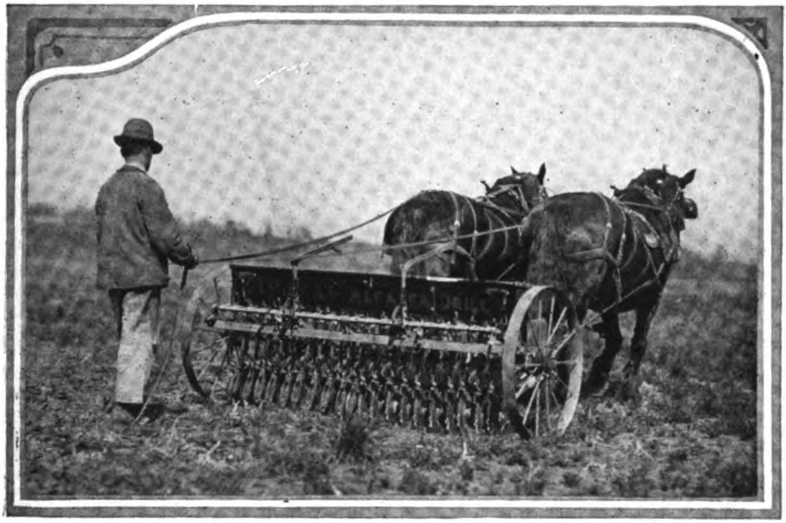
The foxtail millets, Common, German and Hungarian are the varieties most commonly grown in the Northern States. Pearl or cat-tail millet and the Japanese barnyard millet or Billion-dollar grass are also grown to some extent. Common millet is fine-stemmed and leafy and is widely grown. It has a short season of growth and makes a fair yield of good quality

A shoulder high crop of Millet. V-C Fertilizers will make "Your Soil and Crops Pay More."

hay. German millet is coarser than the Common, the season of growth is two weeks longer, the hay yield larger but not quite as good in quality. Hungarian millet yields about the same as the Common and its season of growth is intermediate between Common and German. It is much more likely to volunteer than the other varieties. Pearl millet and Japanese barnyard millet are grown principally as soiling crops. On account of having rather coarse stems they are better suited for soiling than for hay.

Seeding

Millets do best on rich, loam soil which seldom lacks moisture. They are shallow rooted crops and consequently do not stand drouth well. They are non-legumes and are consequently hard on the soil unless well fertilized. An application of farm manure is very beneficial to the crop. When sufficient manure is not available an application of 400 to 600 pounds of fertilizer containing 2 to 4 per cent nitrogen and 10 to 12 per cent phosphoric acid may be profitably applied per acre and disked into the soil before the seed is sown, or applied with grain drill at time of seeding. For sandy soils the fertilizer should contain 2 to 4 per cent of potash.



Reseeding where only a partial stand was secured. Use V-C Fertilizers and be assured of a full stand and a bountiful harvest.

The seed bed should be well prepared as for small grain. The seed may be sown after danger of frost is over, but is generally seeded in June or July. Usually two to four pecks of seed are sown per acre. Pearl or cat-tail millet is usually sown in rows about 3 feet apart and cultivated. One-half to one peck of seed per acre is sufficient.

Cutting and Curing

The best quality of hay is obtained by cutting a few days before the plants come into full bloom. If cutting is delayed until the full bloom stage or later the plants are woody and stock do not relish the hay, and it is a less valuable feed. The process of curing is about the same as for mixed hay.

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INDEX—Continued.

A Family of Corn Champions.

The ambition of most farmers is to be a winner at the International Livestock Exhibition or the Hay and Grain Show held in conjunction with it. Only a few of the thousands of exhibitors can have their desires gratified. One family of Shelby County, Indiana, has had the satisfaction of winning three of the highest Corn Prizes in the last three years.

The Lux family attributes much of its success in producing large yields of prize winning seed corn to the consistent use of V-C Fertilizers.

On the following pages Peter J. Lux tells how he won "The World's Champion Sweepstakes Best 20 Ears of Corn," in 1919 and Mr. Lux is shown with his cup and prize winning ears.

Ed. N. Lux explains the methods by which he produced the ear of Corn which was judged to be "The World's Champion Sweepstakes Single Ear of Corn," 1921.

And Frank W. Lux is shown with the Corn which indicates he is following in the footsteps of his father by winning the "Junior Sweepstakes Champion of the World."

Perhaps the use of some of the Methods employed by this family of champions will aid you in producing prize winning Corn.

"The World's Champion Sweepstakes Best Twenty Ears of Corn"

The following letter written by Mr. Peter J. Lux, the "Corn King," will be of interest to all users of fertilizers. Mr. Lux is very modest in his statement of his winnings. The fact that Mr. Lux's corn was in competition, in the greatest corn show ever held, with 17,000 ears of the best corn the world could produce shows that his right to the title of "CORN KING" is indisputable. The yield obtained through the excellent method of cultivation and fertilization used by Mr. Lux was 73 bushels per acre.

Shelby, Ind., December 15, 1919.

Virginia-Carolina Chemical ~~Co.,~~ Corp.,
Cincinnati, Ohio.

Dear Sirs:

You have no doubt read in the press that I was awarded "the World's Champion Sweepstakes Best 20 Ears of Corn" at the International Show, held at Chicago, November 29 to December 6, 1919. With this honor goes

the handsome Silver Cup of the American Manufacturers Association of Products from Corn, the Blue Ribbon and a substantial cash prize.

The twenty prize ears of white corn were selected from a forty-two acre field of as pretty corn as I have ever seen. This field from which clover hay was cut the previous year, was ploughed ten inches deep in March, 1919, was dragged down when the weather permitted, double disced both ways and then dragged again. After this soil preparation 250 pounds per acre of V-C 20 PER CENT ACID PHOSPHATE was applied broadcast with a grain drill. On May 15, 1919, the corn was planted with an application of


GRAND CHAMPION SWEEP STAKES OF THE WORLD, 1919.

100 pounds of V-C 2-11-0 FERTILIZER drilled in the row with the corn. After the corn was big enough it was ploughed five times at proper intervals with a two row cultivator and just before it began to tassel it was again cultivated with a shallow tooth cultivator. It was then left until the first week in October (which is seed picking time) when I selected these wonderful twenty ears.

I have found that by broadcasting 20 per cent. as an acid phosphate prior to planting in the manner described and when seeding by putting 2 per cent ammonia with available phosphoric acid in the row, the corn is started quickly and is given a finish that no low grade fertilizer will produce. This method of fertilization also ripens it evenly and gives it the quality and constitution desired by national corn experts.

Each ear of the corn that won this great honor at the International Show is ten and one-half inches long, eight inches in circumference and weighs twenty-one ounces.

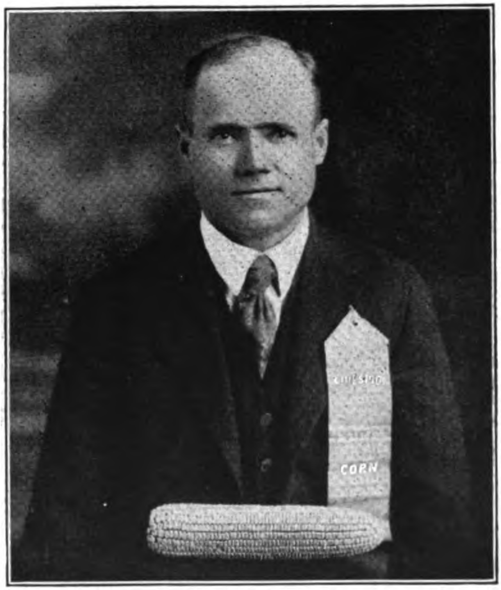
Out of this same field I selected one hundred ears of white corn that won for me the Sweepstakes at the Interstate Show, held at Bethany, Mo., on the 27th day of November, 1919.

In addition to specializing in Johnson County White Dent, I am also a grower of Reid's Yellow Dent seed corn and took second prize at the Chicago International Show on the yellow corn, which was cultivated and fertilized by the same method as I have described.

It is needless to say I am highly pleased at my success.

Very truly yours,

PETER J. LUX.



ED. N. LUX
World's Champion Sweepstakes Single Ear of Corn

JOHNSON COUNTY WHITE DENT AND REID'S YELLOW DENT SEED CORN

Waldron, Ind., Dec. 28, 1921.
Route 2.

Virginia-Carolina Chemical ~~Co.,~~ **Corp.**
Cincinnati, Ohio.

Gentlemen:

This is how I grew the field of corn from which I selected the ear which won "THE WORLD'S CHAMPION SWEEPSTAKES SINGLE EAR OF

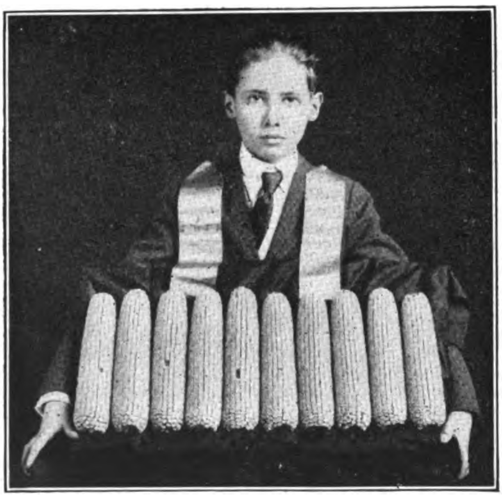
CORN," at the International Show, held at Chicago, November 28, to December 2, 1921:

The field contained 12 acres and had been a clover pasture the preceding year. It was plowed to a depth of 7 inches in March. I used no manure, whatever, on the field but, before planting, I broadcasted V-C 20% Acid Phosphate at the rate of 250 pounds per acre. I then double-disced the field both ways. I also put 90 pounds per acre of V-C 2-12-2 in the row when planting. The seed corn I used was tested for disease.

This field averaged over 90 bushels per acre. The application of V-C 20% Acid Phosphate hurried maturity wonderfully. I selected the prize ear along with other seed the first part of October.

Very truly yours,

ED. N. LUX.



FRANK W. LUX
Junior Corn Champion of The World

Shelby, Ind., December 26, 1921.

Virginia-Carolina Chemical ~~Co.~~ Corp.
Cincinnati, Ohio.

Gentlemen:

Ever since I can remember, I have watched my father (Peter J. Lux) shell, grade and test seed corn. In 1920 I joined the Boy's Corn Club and produced 89 bushels on my acre.

This year (1921) my acre was in a field of well-drained, black loam, clover, sod. It was plowed early, about 9 inches deep, worked well and had 150 pounds of V-C 20% Acid Phosphate broadcasted and harrowed in. Careful cultivation was given and the acre yielded 101.6 bushels from which I selected the 10 ears which won the "JUNIOR SWEEPSTAKES CHAMPION OF THE WORLD."

We have found that V-C 20% Acid Phosphate consistently produces the most prize-winning, disease-free seed corn.

Very truly yours,

FRANK W. LUX.

Free V-C Crop Books

THE Agricultural Service Bureau of the Virginia-Carolina Chemical Company issues a series of crop books similar to this one, which every farmer or land owner will find full of practical suggestions and information on the growing of the leading farm crops.

Each book covers all the steps in the production of the crop, including Soil Management, Soil Preparation, Selection of Varieties, Planting or Setting, Fertilization, Culture, Pest Control, Harvesting and Marketing. The titles of the books and the crop they cover, are as follows:

1. **Cotton.**
2. ***Corn.**
   Field Corn   Sweet Corn
3. ***Tobacco.**
4. ***Wheat, Oats, Rye, Barley and Rice.**
5. ***Grasses for Hay and Pasture.**
   Grasses   Alfalfa
   Clovers   Cowpeas
   Millets   Soy Beans
6. ***Vegetables and Truck Crops.**
   Asparagus   Egg Plant   Pumpkins
   Beans   Garlic   Radishes
   Beets   Leek   Shallots
   Cabbage   Lettuce   Spinach
   Cantaloupes   Onions   Squash
   Cashaws   Peas   Tomatoes
   Cauliflower   Peppers   Watermelons
   Celery   Potatoes, Irish   Hot Beds
   Cucumbers   Potatoes, Sweet   Cold Frames
7. ***Strawberries and Other Berries.**
   Blackberries   Raspberries
   Dewberries   Strawberries
8. ***Orchards and Good Fruit.**
   Apples   Nectarines
   Apricots   Peaches
   Cherries   Pears
   Grapes   Plums
9. **Citrus Fruits and Truck Crops.**
   Grape Fruit   Oranges
   Lemons   Pineapples
   Subtropical Truck Crops
10. **Peanuts.**
11. **Sorghum and Sugar Cane.**

12. **The Boll Weevil and How to Fight It.**

13. **Making Soil and Crops Pay More.**

A Practical Discussion of Soil and Fertilizer Problems.

14. **Apples.**

15. **Sugar Beets.**

16. **Peaches.**

*Indicates that two editions are available, one adapted to Southern conditions, the other to Northern and Western practice.

If you have any question in regard to the Management of the Soil, or the Growing of Crops, which the books do not answer, write the Bureau, stating your problem, and your letter will be given prompt attention. This service is free.

Agricultural Service Bureau,
Virginia-Carolina Chemical ~~Company~~ Corp.
Richmond, Virginia.

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Virginia-Carolina Chemical ~~Company~~ Corp.
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☐ 5. **Hay and Pasture**
☐ 6. **Vegetables and Truck**
☐ 7. **Berries**
☐ 8. **Orchards**
☐ 9. **Citrus**
☐ 10. **Peanuts**
☐ 11. **Sorghum and Sugar Cane**
☐ 12. **The Boll Weevil**
☐ 13. **Making Soil and Crops Pay More.**
☐ 14. **Apples**
☐ 15. **Sugar Beets**
☐ 16. **Peaches**

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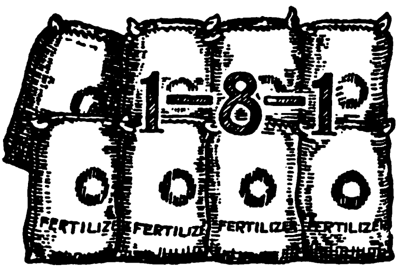
Fertilizers of
High Grade Analyses Save Time, Material, Labor and Money

Low Analysis



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THESE two piles of fertilizer—eight bags on the left, five bags on the right—contain exactly the same amounts of plantfood.

High analysis fertilizer saves three-eighths, or more of the *freight cost*—freight on five tons or less, instead of on eight tons.

High analysis fertilizer saves three-eighths, or more of the *hauling costs*—five trips to the warehouse instead of eight or more.

High analysis fertilizer saves three-eighths, or more of the bag costs—five bags instead of eight.

Finally, high analysis fertilizer saves at least three-eighths of storage costs.

Why not get the most for your money?

Save Money in Buying Fertilizer—Order Analysis Containing Fourteen percent. or over of Plantfood

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The Clarington Planing Mill & Furniture Co.

R. E. Keech, Manager, Clarington, Ohio, writes: "We have been using V-C Fertilizer for the past three years, and we are well pleased with the goods. We can cheerfully recommend V-C to those wanting reliable Fertilizers."

W. M. & H. H. Dennis, Drakesboro, Ky., write: "We purchased a farm a few years ago that had been awfully run down; some of the land too poor for cultivation. This season we used V-C, making the best crops we have ever grown. We are well pleased with V-C Fertilizers and recommend them as great crop producers."

Chas. F. Butt, Franklin, Ky., writes: "We have been using fertilizers for many years, and for the past five years have been using V-C Fertilizers. This year we have the best crop in this section of the county. We can cheerfully recommend V-C Fertilizers as great crop producers."

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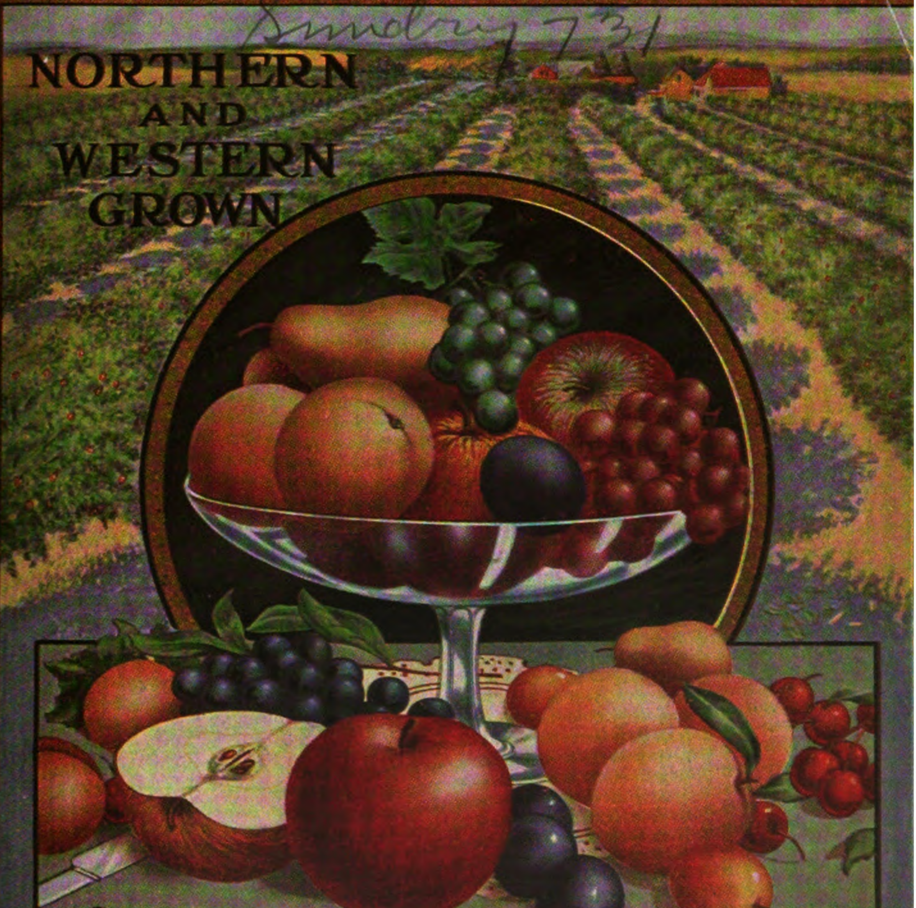

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Recommended by

The Soil Improvement Committee of the National Fertilizer Association.

Crop	Sandy Soil APA-A-P	Loam Soil APA-A-P	Clay Soil APA-A-P
Alfalfa, seeded down	10-2-4	12-2-2	12-2-0
Alfalfa, top dressing	12-0-4	12-0-2	16-0-0
Asparagus	7-5-2	7-5-2	7-5-2
Apples, sod orchard	7-5-2	8-6-0	8-6-0
Apples, tilled orchard	10-3-4	10-3-2	12-3-0
Barley	10-2-4	12-2-2	12-2-0
Buckwheat	10-2-4	12-2-2	12-2-0
Brussels Sprouts	10-3-4	10-3-2	12-3-0
Beets	10-3-4	10-3-2	12-3-0
Beans, garden	10-3-4	10-2-4	10-2-4
Beans, field	10-2-4	12-2-2	12-2-0
Blackberries	12-2-2	12-2-2	12-2-2
Corn, for grain	10-2-4	12-2-2	12-2-0
Corn, for silage	10-2-4	12-2-2	12-2-0
Clover, seeding	10-2-4	12-2-2	12-2-0
Clover, top dressing	12-0-4	12-0-2	16-0-0
Cabbage	10-3-4	10-3-2	12-3-0
Cauliflower	10-3-4	10-3-2	12-3-0
Carrots	10-3-4	10-3-2	12-3-0
Cucumbers	10-3-4	10-3-2	12-3-0
Celery	10-3-4	10-3-2	12-3-0
Grass, seeding	10-2-4	12-2-2	12-2-0
Lettuce	10-3-4	10-3-2	12-3-0
Millet	10-2-4	12-2-2	12-2-0
Meadow, top dressing	7-5-2	8-6-0	8-6-0
Mangels	10-3-4	10-3-2	12-3-0
Melons	10-3-4	10-3-2	12-3-0
Oats	10-2-4	12-2-2	12-2-0
Onions	8-2-8	8-2-8	8-2-8
Permanent Pastures, top dressing	12-0-4	12-0-2	16-0-0
Parsnips	10-3-4	10-3-2	12-3-0
Potatoes, late	10-3-4	10-3-2	12-3-0
Peas, field	10-2-4	12-2-2	12-2-0
Peas, garden	10-3-4	10-2-4	10-2-4
Peaches	7-5-2	8-6-0	8-6-0
Rye, fall seeding	10-2-4	12-2-2	12-2-0
Rye, spring top dressing	7-5-2	8-6-0	8-6-0
Rutabagas	10-3-4	10-3-2	12-3-0
Raspberries	12-2-2	12-2-2	12-2-2
Sweet Corn	10-3-4	10-3-2	12-3-0
Sugar Beets	10-3-4	10-3-2	12-3-0
Spinach	7-5-2	7-5-2	7-5-2
Strawberries, spring setting	10-3-4	10-3-2	12-3-0
Strawberries, top dressing	7-5-2	8-6-0	8-6-0
Squash	10-3-4	10-3-2	12-3-0
Timothy, top dressing	7-5-2	8-6-0	8-6-0
Turnips	10-3-4	10-3-2	12-3-0
Tomatoes, cannery	10-2-4	10-2-4	10-2-4
Wheat, fall seeding	10-2-4	12-2-2	12-2-0
Wheat, spring top dressing	7-5-2	8-6-0	8-6-0

Orchards and Good Fruits

Northern and Western Grown

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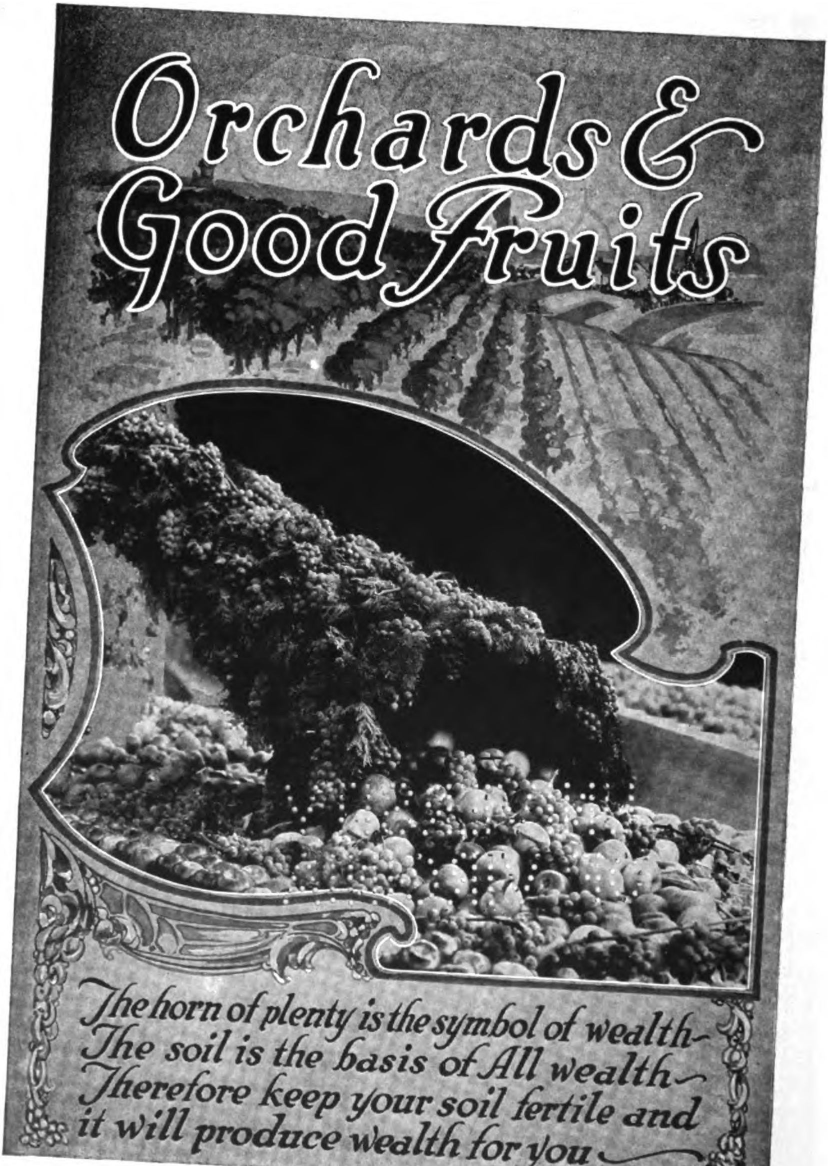

Orchards & Good Fruits
The horn of plenty is the symbol of wealth—
The soil is the basis of All wealth—
Therefore keep your soil fertile and
it will produce wealth for you

Orchards and Good Fruits

Northern and Western Grown

Have you ever felt that the fellow who grows fruit successfully has been especially favored by Nature? It is wrong to entertain such opinions, because successful fruit growing is but the thoughtful and thorough application of tested methods and common sense.

The following pages were written by a successful fruit grower, who has had an opportunity to study the best methods employed by the growers in this country.

There are certain things common to all fruits and these have been included in the first part of the booklet.

Emphasis must be placed on the careful selection of the site and varieties. The care and management of the orchard and the proper feeding of the trees are factors which must have your serious consideration.

V-C Fertilizers are designed to meet these special needs and are used in hundreds of the most profitable orchards.

Practical Fruit Growing

Fruit growing has always been of interest to the American farmer. The pioneers considered the home orchard an essential factor on every farm. They planted trees in the newly cleared soils which were rich in available plant food and the homes were bountifully supplied with perfect and delicious fruit. It was recognized as an important part of the diet and was depended upon to preserve the health.

As the soils became depleted in fertility and the disease and insect enemies multiplied it became more difficult to produce the perfect specimens that once had been so plentiful and thousands of starving and diseased orchards were permitted to die of neglect. Out of this discouragement came a new determination upon the part of scientists and growers to overcome the conditions that had so materially affected the fruit growing industry.

Careful study and experiments showed that many of these old neglected orchards, which were regarded as blotches on the landscape could be made productive and profitable by proper spraying, fertilization and management. That resulted in a revival in fruit growing and within the last twenty years the industry has assumed a prominent place in our agriculture. Large sections of the country have become prosperous by producing fruit that is famous the world over.

The Farmers Interest in Fruit Growing:

Plenty of fruit the year around is essential to the best health and the farmer should provide an adequate supply for his family.

Many farms have mature orchards on them that are unprofitable and which the farmers are desirous of renovating and making profitable.

Another reason for the farmer being keenly interested in fruit growing is that the small commercial orchard of a few acres can be operated as a unit on the general farm more economically than it can in any other way, because the operating costs are lower and the profits relatively higher.

Intercropping Peach Orchard with Cantaloupes. Two profits can thus be realized if the proper amount of fertility is added to the soil. V-C Fertilizers will fill the needs of your soil and crop and will increase your yield.

The Home Orchard:

The object of the home orchard is to furnish sufficient fruit for the family and it is important that a succession of varieties should be planted which will ripen from early season until late fall. This makes it possible to have a maximum amount of fresh fruit and plenty for canning, drying and storing. The home orchard should be as near the home as possible to facilitate care and harvesting.

The Commercial Orchard:

Since it has become evident that the production of perfect fruit is no longer a matter of chance but a question of thoughtful and thorough application of tested methods, commercial fruit growing has made a stronger appeal to the farmers. The small commercial orchard operated in connection with the general farm affords the soundest business basis for profitable fruit production.

Teams and the greater part of the tools necessary for the orchard operations are already a part of the farm equipment and the overhead cost of operation is greatly reduced. The proper selection of the site and of three or four high grade commercial varieties make it possible to utilize some of the rolling land more profitably than could otherwise be done.

Factors to be Considered:

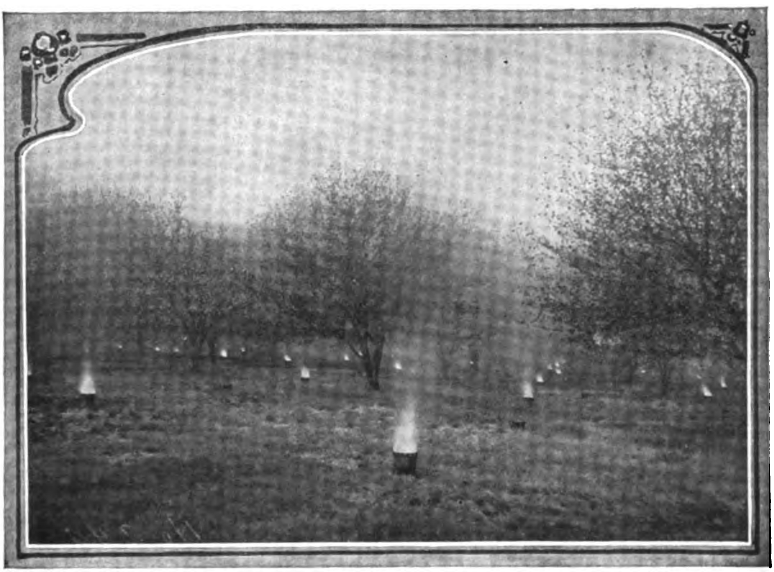
The home orchard does not involve the market problems but the commercial orchard necessitates the careful study of location, soil, condition and market preferences.

The orchard should be located near a good shipping point and preference should be given to a location providing an outlet to more than one good market. If the orchard is to be comparatively small or composed of fancy varieties it should be located reasonably near a good town or city which

will provide a good local market. The matter of good roads from the farm to the loading station or local market must be given careful attention because bad roads will greatly increase cost of production and marketing. The size of the load that can be hauled is a prime factor in cost of production. The availability of extra labor is highly important if the orchard is large. The possibility of a good water supply must be settled satisfactorily before deciding to locate an orchard, because a survey of the cost of spraying farm orchards reveals the fact that where there is a water supply in the orchard the cost of spraying averages about one-half as much as it does where the water must be hauled.

Soil:

The soil for the orchard should be well drained and should not be depleted of its natural supply of organic matter, and available plant food. A sandy clay loam seems to be very well adapted to all fruits. If a medium loam is not available the peach does better on the lighter soils while the apple, pear and cherry prefer the heavier soils. Avoid shallow soils which have unbroken rock very near the surface and soils underlaid with an impervious hard pan. The flat, poorly drained white clay soils and the level black muck soils are not adapted to orcharding.



Thousands and thousands of dollars annually are saved by the use of the Orchard Heaters. Their cost and maintenance is very small compared to the value of the crop saved.

Site:

After finding that soil conditions are adapted to fruit production the question of air drainage must be given consideration. The ground upon which the orchard is to be planted should be higher than the surrounding country to insure the drainage of cold air which moves from the higher ground to lower levels. Low land or valleys from which the cold air cannot escape should be avoided because the trees will be more subject to frost injury. If peaches are to be grown or if it is desired to manage the orchard under the clean culture cover crop system the orchard site should be level enough to permit cultivation without danger of washing. A gentle slope insures good water and air drainage and will permit cultivation. Steep slopes are not adapted to commercial orcharding because of the difficulty experienced in pruning, spraying and harvesting.

Selection of Varieties:

The choice of varieties of the several orchard fruits must be governed by a number of factors. The home orchard is primarily intended to supply fresh fruit throughout a long period. This necessitates planting of varieties having a succession of ripening dates ranging from early till late season. Personal tastes and preferences will govern the final selection.

All varieties planted must be adapted to the community in which they are to be grown and the advice of the State Agricultural Experiment Stations should be requested. The experience of growers in any locality should be studied and considered. The commercial grower must consider a number of factors when selecting varieties. The different markets have a preference for certain varieties and packages and these demands must be known. The varieties should be heavy bearers because there is considerable difference in the returns per barrel and the returns per tree. Some high priced varieties do not yield well and should be planted with caution. The fruit should have good keeping and shipping qualities and be fairly resistant to disease. The trees should be hardy, vigorous and regular bearers. There is more money in marketing a large quantity of a few standard varieties than a small amount of a large number of varieties, therefore the commercial grower should not plant more than three or four varieties of a single fruit. Beware of novelties that are not established on the market.

Nursery Stock:

When buying nursery stock the grower should make every effort to purchase trees that are well grown and of good size and shape for the age and variety. They should be true to name and free from insects and diseases; their appearance should indicate that they are healthy and were properly cared for after being dug from the nursery row.

One year old stock is usually recommended for planting because they are cheaper and usually suffer less shock in transplanting; they also are more easily trained. Either one year or two year old stock may be used if well grown but older trees should not be accepted.

Do not buy cheap trees and in every case deal with a reliable and established firm. The unreliable traveling nursery agent has been responsible for a great deal of disappointment in the past and should be avoided because many of them deliberately misrepresent the stock they sell.

If, as is preferable in a large majority of cases, the orchard is to be set in squares, the first step for insuring perfect alignment of trees is the establishment of a base line. Let it be assumed that this line will be on the west side of the orchard and that it will run North and South from A. to L. (see diagram page 8). This line should be straight and marked by setting a light stake in the place where each tree in this row is to be set. In l'ke manner run the line on the east side from A. to L. and mark with stakes such places where trees are to be set, as was done on the west side. This establishes the rows running East and West, the North one being A. to A. and the South one L. to L. The next step is to open these rows by running two furrows with a turnplow turning the soil in opposite directions. This should be done by a good plowman, a well trained team and the use of guide poles. If the land has been well prepared and is comparatively level no difficulty should be experienced in making the rows straight if they are run by an experienced plowman. These rows may now be checked by running similar furrows North and South, and a tree set at each intersection. To do this establish another base line on the North side of the orchard and still another on the South side, marking the places for each tree to go in these lines. These lines are parrallel with each other and at right angles with the lines on the East and West sides. Then, with the guide pole, a good plowman and team, the checking furrows may be run. Time may be saved, however, and greater accuracy secured by the use of a wire or stout twine instead of a plow for establishing the North and South rows, so that they will check with the East and West rows. The wire or twine is stretched across the rows marked East and West by the plow, at a distance from the West side base line equal to the spacing to be given the trees in the row. As a row is set the wire is moved to mark the cross alignment of the next row. This establishes North and South and East and West rows at right angles with each other, and each intersection marks the place a tree is to be set. If the North and South lines (A and A and L and L), are set first and accurately aligned and an intermediate row (FF) next set in alignment with the two already set, then these three rows will serve as guides for the accurate checking of the remaining trees to be set.

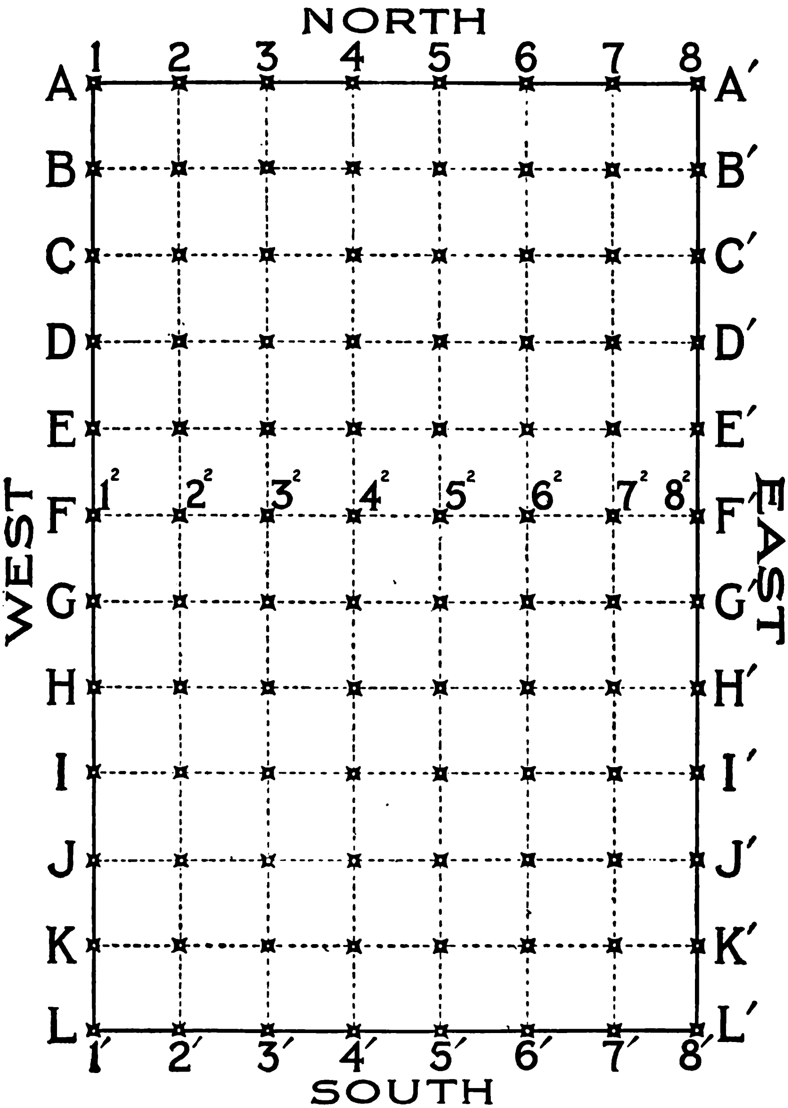


Diagram for guidance in properly laying out new Orchard. Detailed description for this diagram will be found on preceding page.

Spring Planting or Fall Planting:

This subject has been the source of considerable discussion and inasmuch as both times of planting have distinct advantages the work can be successfully done at either time. If the trees have been properly stored at the nursery they will be in better condition in the spring than trees which have been exposed to severe winter weather and the possibility of being injured by the rabbits. A dry, open winter is injurious to newly set trees and there is also a risk of injury from ice forming around the crown that is escaped by spring planting. In favor of fall planting, it can be said that the trees may be set when there is more time for the work and there will be no possibility of the trees losing any vitality by being stored. By purchasing in the fall it is possible to get the pick of the stock. The roots of trees set in the fall have an opportunity to form callouses over the injured surfaces and can start growing earlier in the spring.

Care of Trees Before Setting:

It is important that the trees should be given careful attention as soon as they are received from the nursery.

If the stock arrives during temperate weather it should be heeled-in. This is done by digging or plowing out a trench so the trees can be placed in it. The trees should be unpacked carefully and all bundles untied so that each tree is separate. These are laid in the trench in a slanting position with the tops to the south. Moist dirt is thrown on and worked among the roots. Sufficient dirt is then shoveled on them to thoroughly protect the crowns and roots systems. Trees received during freezing weather should be put into a cool, damp place to thaw out gradually before heeling-in. If there is danger of rabbits injuring the nursery stock, build a tight fence around the place where the trees are kept.

Planting Plan:

The common plans used are the square system and the triangular system. The square system is simple and is recommended for general planting because most men understand the method of laying it out.

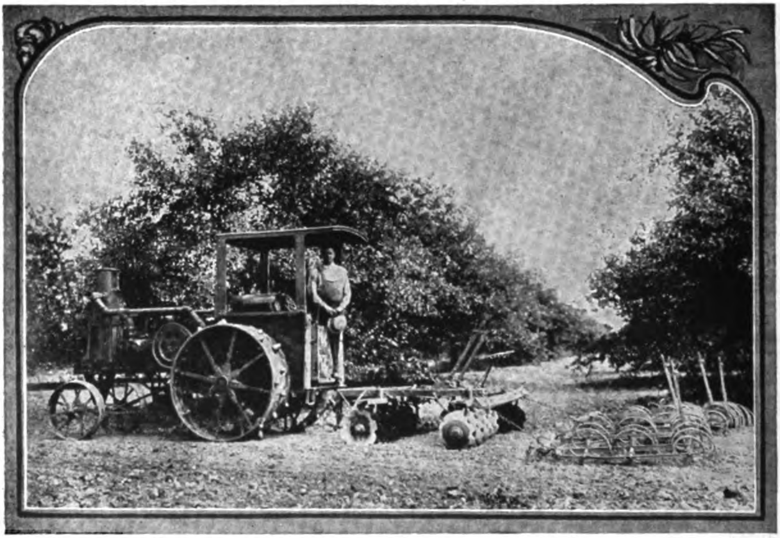
In this system the rows are laid out an equal distance apart each way thus making it easy to lay out, cultivate, spray and harvest the orchard crops.

The triangular or hexagonal system uses the ground more economically and enables the grower to plant about 10 per cent. more trees than is possible when using the square system. Due to this economy the system has been used in sections where the ground is very high priced but on medium priced land and on small irregular areas the advisability of using this system is questionable.

Planting Methods:

If a large number of trees are to be set it is customary to use at least two or three men in the planting crew, and they should set from 300 to 400 trees per day. All broken roots should be pruned off of the tree before planting, leaving smooth, clean surfaces which will callouse easily. The holes for the trees should be dug large enough to accommodate the root systems when spread out.

The trees should be set a little deeper than they were in the nursery row and the top, rich dirt should be placed firmly about the root system before filling the hole. It is advisable to mix a little V-C Fertilizer with



In large Orchards a saving can be accomplished by using the tractor for plowing and cultivating This tractor is hauling two gangs, one disc harrow, and one spring tooth harrow, both types being admirably suited to orchard cultivation.

this top dirt before putting it around the roots because it will provide readily available plantfood for the tree.

The following table gives the number of trees that may be planted per acre at different distances.

	Square System	Triangular System
15 x 15 feet	193	224
18 x 18 feet	134	156
20 x 20 feet	108	124
24 x 24 feet	75	80
30 x 30 feet	48	56
33 x 33 feet	40	46
35 x 35 feet	35	41
36 x 36 feet	33	39
40 x 40 feet	27	31

Preparation of the Soil:

The preparation of the soil for the young orchard will depend upon the system of orchard management to be practiced later. This depends largely upon the contour of the land, and the paragraphs on orchard management should be considered carefully before making final decision regarding the preparation of the soil for planting.

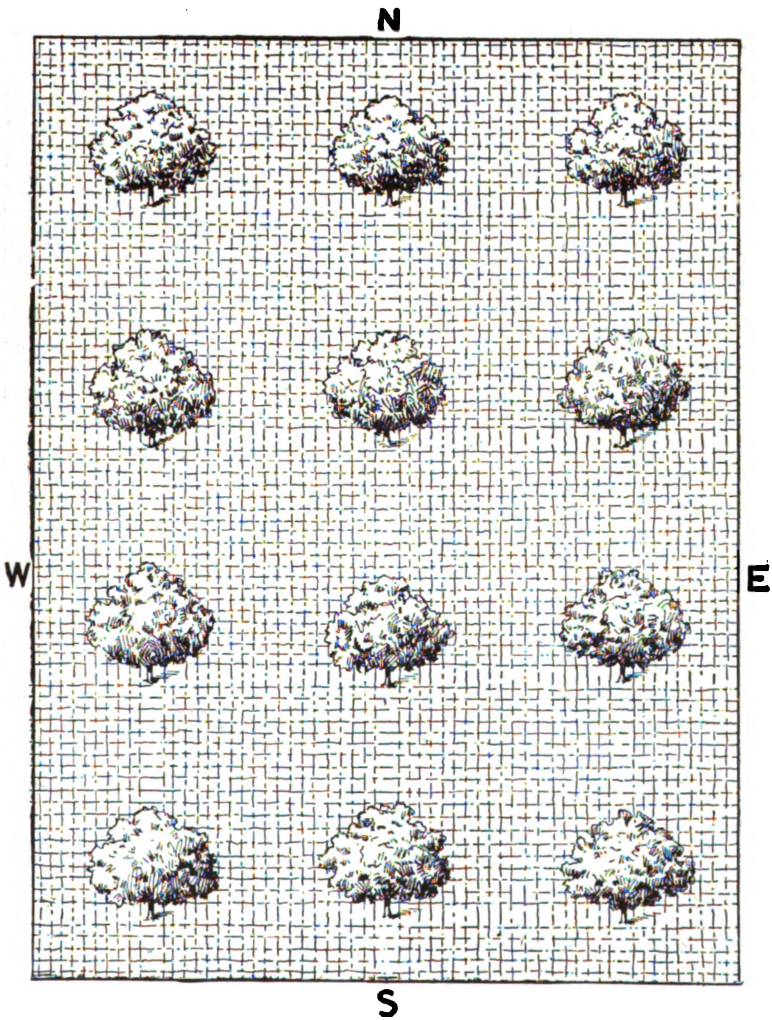
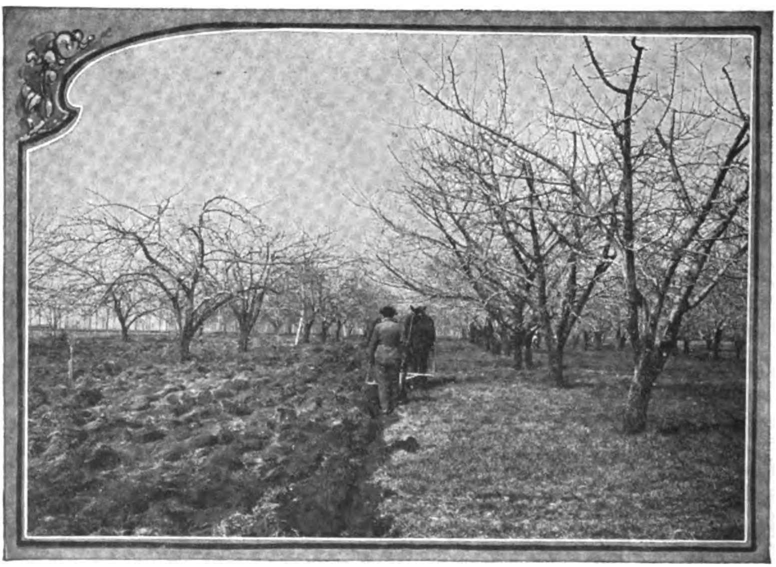


Diagram showing Proper Orchard Cultivation. The lines running North and South and East and West are lines of Cultivation. By following out this scheme the entire area will be cultivated and your soil will be in good condition and free from weeds, which is not the case in one way cultivation.

On comparatively level ground that may be plowed without danger of washing the clean-culture-cover-crop system is usually followed. It is advisable to plow and prepare the soil a few months before planting time. If fall setting is anticipated the ground should be worked early and sown to a crop in August. If the trees are to be set in the spring the ground can be plowed in the fall or early spring and thoroughly disked and harrowed before setting time. In either case a cultivated crop such as potatoes or tomatoes may be grown between the rows while the trees are young. If the orchard site is hilly so that cultivation is not advisable because of the tendency of the soil to wash, the mulch system of orchard management should be practiced throughout the life of the orchard and this has a definite bearing on the preparations for setting. This system is designed to furnish enough mulching material such as grass, straw, weeds, etc., to prevent the evaporation of the soil moisture. This is accomplished by making a mulch collar around the young trees in the spring which is heavy enough to kill the grass under it, and care should be taken to keep the material away from the tree several inches. Trees set in sod must be thoroughly mulched from time of setting and if the ground cannot furnish sufficient mulching material, extra straw or grass should be secured.

Trees managed under the sod-mulch system may suffer more from field mice than when the clean culture system is practiced and tree protectors should be put on soon after planting.



Spring plowing. The sod is turned under and furnishes valuable organic matter which loosens up the soil and increases the availability of the plant food in the soil.

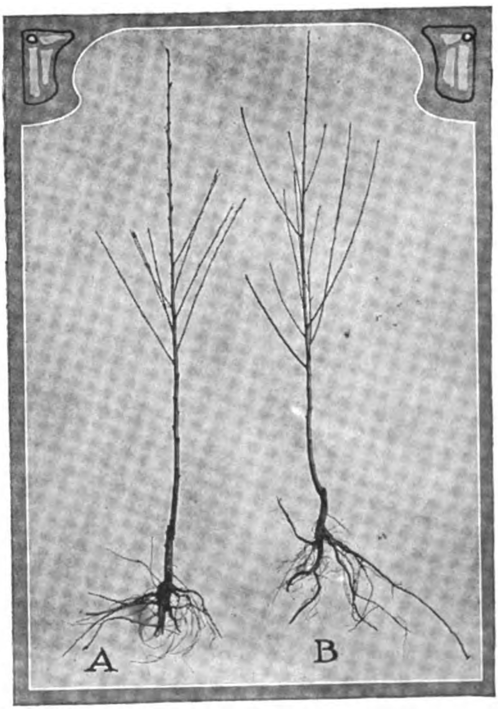
The plan is sometimes followed of plowing strips on a hilly orchard site and setting the trees in the cultivated area. The plowing is done with the contour of the hill and the middles are left in sod which prevent the greater part of the washing. This strip is sown to a cover crop each summer so the supply of organic matter may be maintained satisfactorily.

It is important to emphasize the fact that in practicing any one system, it must be done thoroughly to insure a thrifty, vigorous development of the tree.

Pruning the Young Tree:

Pruning is important because a well developed tree may be sprayed and picked more economically than an untrained tree.

The central leader system of pruning is being adopted quite generally now, except for peaches, because it developed a stronger head with a greater bearing surface. The initial pruning is given the first spring before time for the buds to swell. On a one year old tree this consists of cutting the tree to a whip about 36 inches high. The second season about four scaffold limbs



Before being pruned. These peach trees are now headed 16 and 12 inches respectively and when set in the orchard row they will be set about 4 inches deeper than they were in the nursery row, and will be headed 12 and 8 inches respectively.

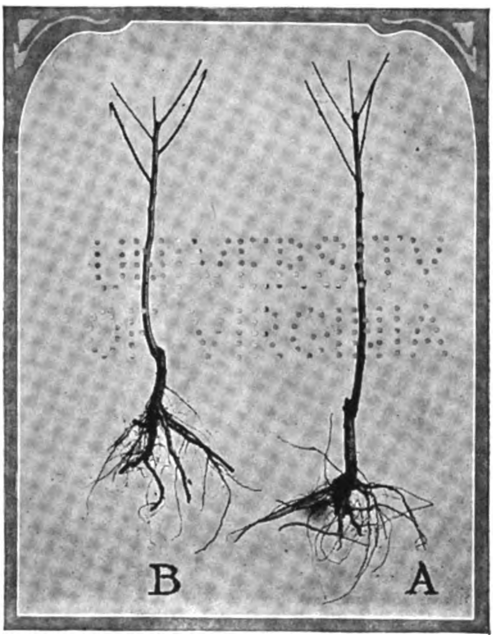
If the blossoms are to develop into high grade fruit the orchard soil must be fertile. V-C Fertilizers applied properly in your orchard will supply the proper nourishment to your trees..

should be selected that are well placed on the trunk and the balance are removed. No two limbs should be opposite each other and they should be well spaced around the tree, with each limb at a different height from the ground.

The pruning in succeeding years will consist of thinning out the interfering branches and developing a well balanced top. The top must be open enough to permit the entrance of plenty of sunlight and air. Water-sprouts should be kept off of the tree and care should be taken to see that diseased wood is removed.

Companion Cropping in the Young Orchard:

In young orchards where the clean-culture cover-crop system of management is practiced it is profitable to plant such cultivated crops as early potatoes, tomatoes, and truck crops such as cabbage, beans, peas, beets, etc. These crops can be grown and removed in time to sow a cover crop such as rye which will survive the winter, hold the ground, add organic matter to the soil and take up the plantfood that becomes available during the winter season. Strips of ground five or six feet wide should be left on each side of the trees so that thorough cultivation may be given them from the time the cover crop is turned under until the cover crop is sown in the late summer. **These truck crops will pay a high profit on liberal applications of fertilizer and the soil improvement will promote vigorous development and early bearing of the trees.**

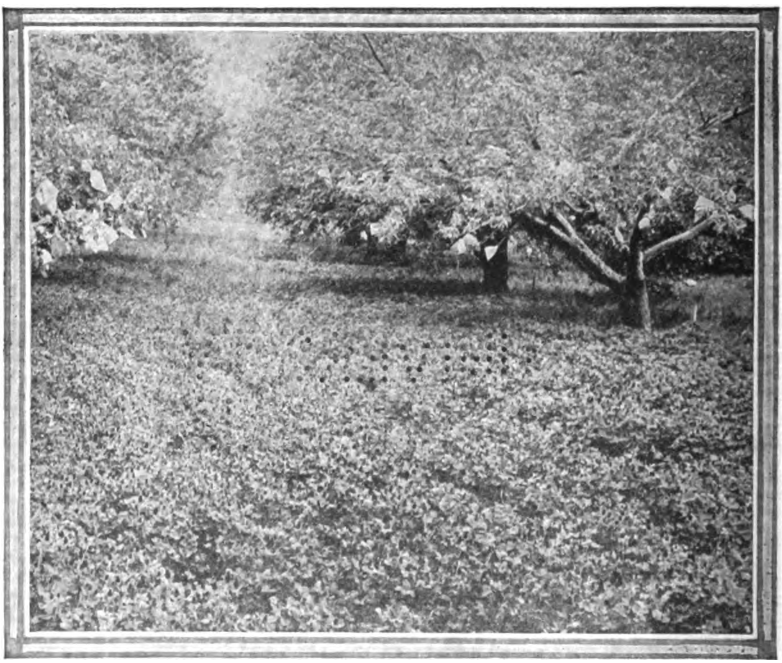


The same Peach trees as shown on page 13, after pruning. The bruised and broken roots are cut away leaving smooth wounds which heal quickly.

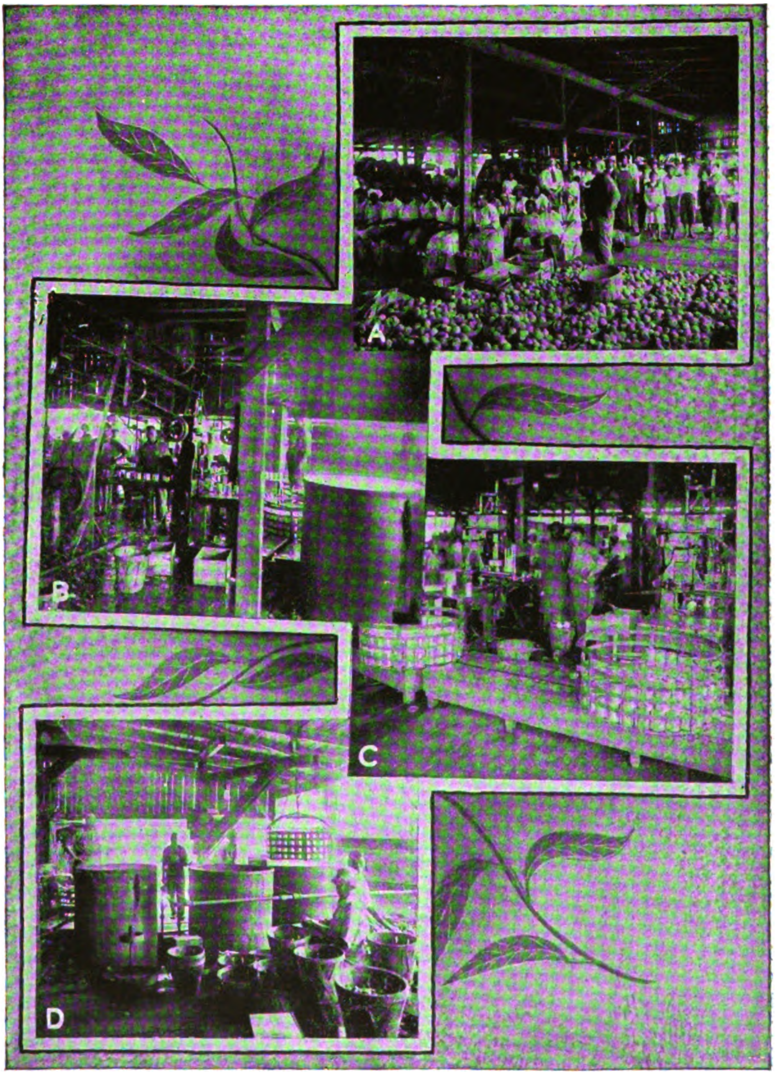
Strawberries and bush fruits may be grown between the rows but are not as satifactory as the aforementioned truck crops. It is not advisable to grow hay or grain crops in the young orchard that do not permit clean cultivation and the sowing of a late cover crop.

Renovating the Old Orchard:

On many farms there are mature orchards which may be made highly profitable by proper pruning, fertilization and orchard management. Most of these old orchards are starved and should be plowed in the early spring about four inches deep, disked and harrowed until late summer. This will overcome the sod-bound condition and conserve the moisture. An application of 400 to 500 pounds of V-C Fertilizers should be broadcasted between the rows so the trees may have sufficient available plantfood to make a good growth, mature the season's crop and form fruit buds for the next year's crop. The trees should be pruned and sprayed so they can make profitable use of the available plant food.



Crimson Clover as an orchard cover crop. Fertilizer applied to the cover crop and to the trees will benefit both in a large measure and will insure soil fertility in your orchard. V-C Fertilizers always give the highest results for all crops and on all soils.



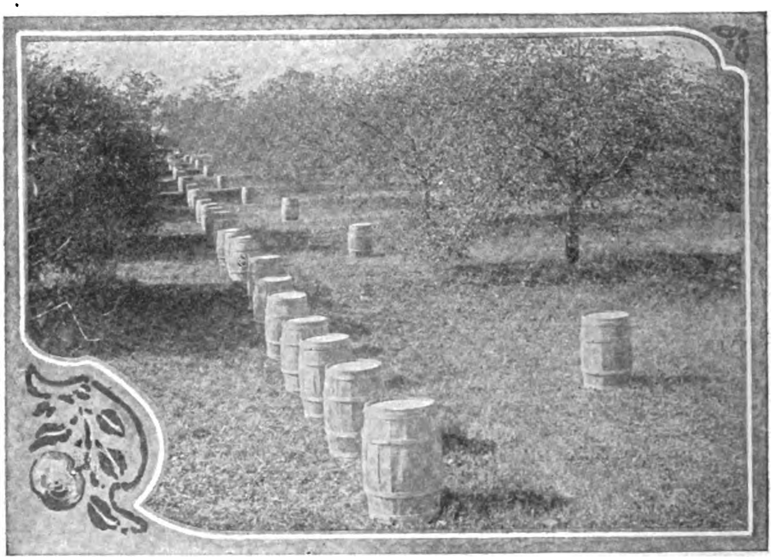
INTERIOR OF PEACH CANNING FACTORY.

A—Peaches as they come to the factory from the orchard. Women peeling peaches in the background.
B—Capping machines and cooking vats. The cans are filled here and are being sealed preparatory to being placed in the steam cooking vats.
C—Cans in containers all ready for cooking in the steam vats.
D—Containers holding filled cans being lowered into steam cooking vats.

Fertilizing the Orchard:

The orchardist must appreciate the fact that the trees remain in a fixed position and that maximum production can only result from good soil management. The grain crops are fertilized and rotated to improve yields and the same treatment must be applied to the orchard because the trees utilize enormous quantities of plantfood when producing large crops. Otherwise the trees struggle for an existence and the crops are small and unsatisfactory.

Many orchards bear crops every other year. This alternate bearing habit results from the trees exhausting the supply of plantfood in maturing the crop on the trees and not having sufficient energy to mature the fruit buds for the succeeding season. The Indiana Experiment Station Bulletin



What Fertilizer will do for Apples. It was applied at the rate of 12½ pounds per tree in conjunction with one bale of straw annually, and on the row to the right no fertilizer was used. The differences in the yield between the fertilized row and the unfertilized row was 37 barrels of apples the fertilized having made 46 barrels and the unfertilized 9 barrels. At a fair price per barrel this would leave a handsome profit for the man who uses Fertilizer.

194 reports the renovation work in a number of orchards and shows that one ten-acre orchard which had been a liability on the farm was made to produce an annual average net return of $168.00 per acre for five years and another which received application of 6C0 pounds of complete fertilizer per year was brought into annual and profitable production. The Ohio Experiment Station likewise shows that mature orchards may be made highly profitable units on the farm by proper renovation and fertilization.

Bulletin 121 of the Pennsylvania Experiment Station shows striking and convincing results from the use of fertilizer in apple orchards. Four years results on one plot which was fertilized with a complete fertilizer show that a total of 17,127 pounds of apples were produced and on a similar

plot beside it which was not fertilized only 4,557 pounds of apples were produced during the same time.

In another test covering a four year period a fertilized acre produced 513.8 bushels of apples and an unfertilized acre produced 137.7 bushels, giving 377.1 bushels in favor of fertilization.

How to Apply Fertilizer:

It is customary to apply fertilizer to the young trees in the spring by hand, using a small hand shovel, trowel or shallow dipper for the work. The material is hauled in a wagon driven through the orchard reasonably close to the trees and is shovelled out of the bag or a tight box and spread around the trees. Do not put the fertilizer closer than a foot from the trunk. If the young orchard is to be cultivated, apply the plantfood after

Clean cultivation such as this will allow all the plant food in the soil to be used by the trees in producing a full yield of high grade fruit instead of letting weeds reap the benefit of the fertility in the soil.

the ground has been plowed and work it in with a cultivator or a rake. In sod-mulched orchards it is advisable to fertilize the trees just before applying the mulching material.

After the trees are eight or ten feet high it is more convenient to use a grain drill which has a fertilizer attachment and drive this machine within three or four feet of the trunk. Keep in mind that the feeding roots extend several feet from the body of the tree and it is these fine roots that make the most efficient use of the fertilizer.

If you grow truck crops or cover crops between the trees the fertilizer may be most conveniently applied for these crops with a regular grain drill because the intercrops utilize the plantfood that the trees do not get.

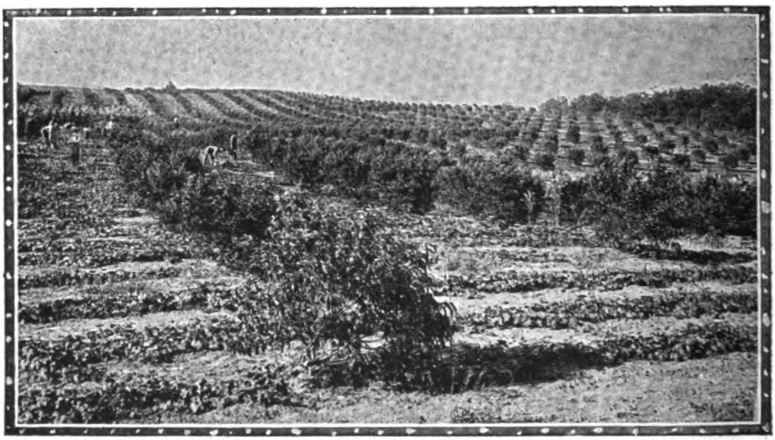
In mature orchards the fertilizer drill or the grain drill with the fertilizer attachment is generally used, and the material is spread over the greater

part of the middles. It is necessary to drive both ways through the old orchard in order to apply the fertilizer uniformly.

Orchard Management:

The successful development of an orchard depends upon giving it good care and management at all times. The trees cannot be expected to take care of themselves and yield profitable returns. Orchards should not be planted or reclaimed in a burst of enthusiasm that will subside before the trees come into profitable bearing because such action will only result in loss and disappointment. With foresight and determination the orchard can be made very profitable and deserves the consideration of the general farmer who has rolling land or land that lies above the surrounding country.

One interested in orcharding should be acquainted with the two most successful systems of orchard management, known as the clean-culture cover-crop system and the sod-mulch system. The objects of these systems are to conserve the soil moisture and increase the fertility of the soil and either system will accomplish the desired end if carried out thoroughly.



An Indiana Peach Orchard with Cantaloupes growing between the rows of trees.

The choice between the two systems will depend upon the condition of the soil; whether or not the orchard is too rolling to cultivate and the availability of a sufficient supply of cheap mulching material.

On rolling land which is liable to wash, the mulch system should be adopted. In young orchards managed under this system the grass is cut three or four times a year, raked up and spread out around the young trees making a mulch collar eight to twelve inches thick. Care should be taken to keep the material away from the trunk of the tree at least ten inches. If the soil is not productive enough to grow sufficient grass the field should be disked, fertilized and harrowed to improve the growth. Reseeding with orchard grass may be done if the stand of grass is not good. The mulch collar around newly set trees should be about six feet in diameter and this is gradually increased as the trees get older. If it is impossible to cut

enough grass for the mulch at first, use straw, stubble clippings and cut weeds for the mulching material. It is practically impossible to grow enough material in a mature orchard and it is therefore necessary to supplement it with outside material. A well grown fifteen year old tree will require at least two bales of straw, or an equal amount of leaves, grass or weeds to make sufficient mulch.

Properly done, this system is very satisfactory because it conserves the moisture and the ground is always in good condition for hauling or spraying. An application of five to ten pounds of fertilizer per tree applied in the spring before mulching the first time is advisable in most orchards. It is necessary to guard against fire and mice injuring the trees when this system is practiced.

Intercropping with cotton on orchard land of Mr. H. C. Neil, Fort Valley, Ga. Mr. Neil is a firm believer in V-C and uses it on all his crops. Their quality and reputation attest to the soundness of his judgment.

Clean Culture Cover Crop System:

This method involves the plowing or disking of the orchard every spring and cultivating it like a corn field until time to sow the cover crop. If the orchard is slightly rolling the plowing should be done with the contour of the land to prevent washing. The cultivation can be done with disk harrows or spring-tooth harrows and it is important to cultivate as soon as possible after every rain or at least every two weeks until time to sow the cover crop. Care must be taken in cultivating so that the trees will not be injured by the teams or implements.

This system is eminently satisfactory and may be employed in a large per cent. of the orchards.

Cover Crops:

The continuous cultivation of any piece of land will burn the organic matter out of the soil unless manure and green crops are turned under to replenish that which is lost. The abundant supply of humus is as essential to good crop production in the orchards as it is to a crop of corn because this decaying organic matter assists in making the plantfood available to the trees. It also makes the soil more friable, and increases the ability of the

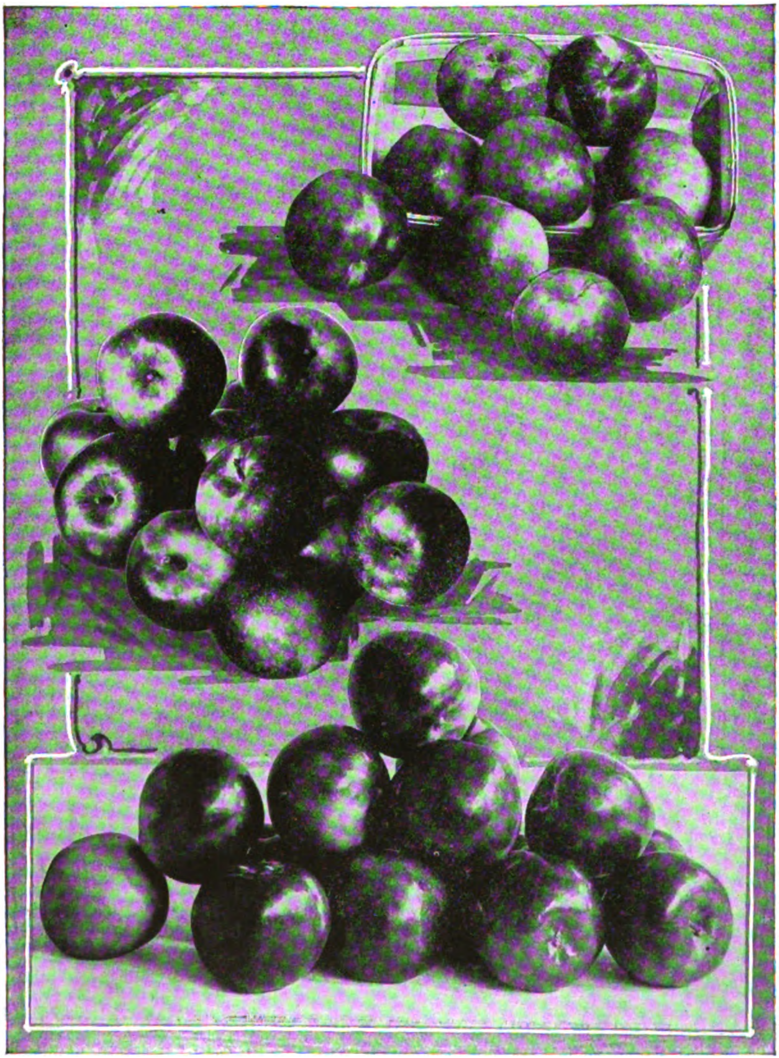
soil to maintain the best conditions of moisture. Likewise, the maximum benefits of fertilizers are obtained on soils well supplied with humus, and it is therefore important that some crop be sown in the cultivated orchards during the latter part of the summer.

It is preferable to use a crop that will live through the winter and which is adapted to a wide variety of soils. General experience has proven rye to be one of the best cover crops, because it can be sown as cheaply as any and is more likely to give a satisfactory stand than most crops. Vetch is often recommended but the seed is expensive and it is hard to get a catch on many soils. In the sections enjoying mild winters, crimson clover may be used successfully.

Using Buckwheat as a cover crop in an Indiana Orchard. When this crop is turned under it will return to the soil a valuable amount of organic matter which aids greatly in keeping the soil in ideal condition fo crop production.

Many orchardists use cowpeas, soybeans, millet or buckwheat very satisfactorily but these crops are not winter-surviving and cannot utilize the plantfood that becomes available during the winter and early spring; therefore such a crop as rye is given preference.

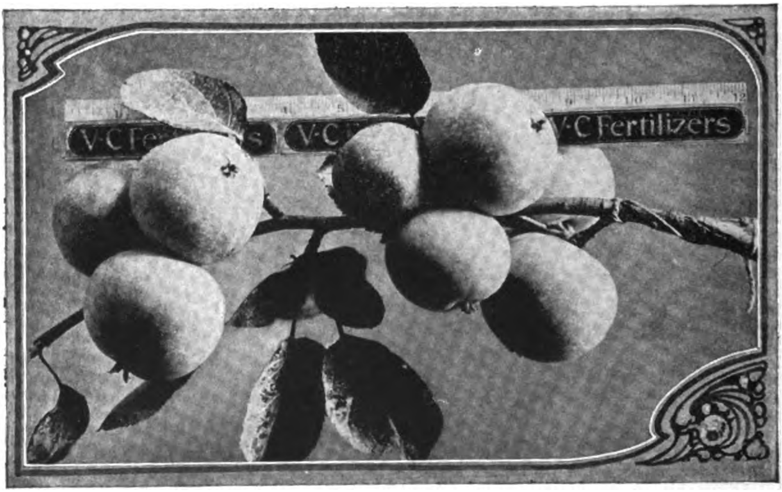
It is evident that a rank growth of the cover crop is desirable in order to turn under the maximum amount of priceless organic matter and this can best be accomplished by making a liberal application of complete fertilizer at the time of sowing the cover crop. In this way the crop will predigest the plantfood and return it to the trees when the crop is turned under.



Fine specimens of three well known apple varieties; Jonathan, King David, and Baldwin.

Apples

The Apple has long been recognized as the King of Fruits and the consuming public is more thoroughly appreciating its general use in the diet. Few fruits can be utilized in as many excellent ways as can the apple. It can be held in storage so that the market may be constantly supplied with fresh apples. It may be used in the home as a desert or may be baked, dried, canned and used for jellies or vinegar. There are more than two hundred ways of cooking this delicious fruit and the demand for it is constantly growing. As a fruit, it has been advertized extensively and today a fine apple is recognized as a representative sample of a great industry that has been put on a business basis. The barreled or boxed fruit in storage has a cash value on which the owner may borrow money. This indicates that apple growing has passed the experimental stage and is a substantial business proposition.



Two clusters of Stayman Winesap apples in "Rose Cliff" Orchard of James Craig, Waynesboro, Va. Mr. Craig uses V-C Fertilizers exclusively and it is no wonder that he is so enthusiastic over the results it brings him.

The farmer need not fear overproduction because many of the old orchards have been permitted to go into decay and the industry is getting into the hands of farmers and growers who are interested in it as a business on the farm.

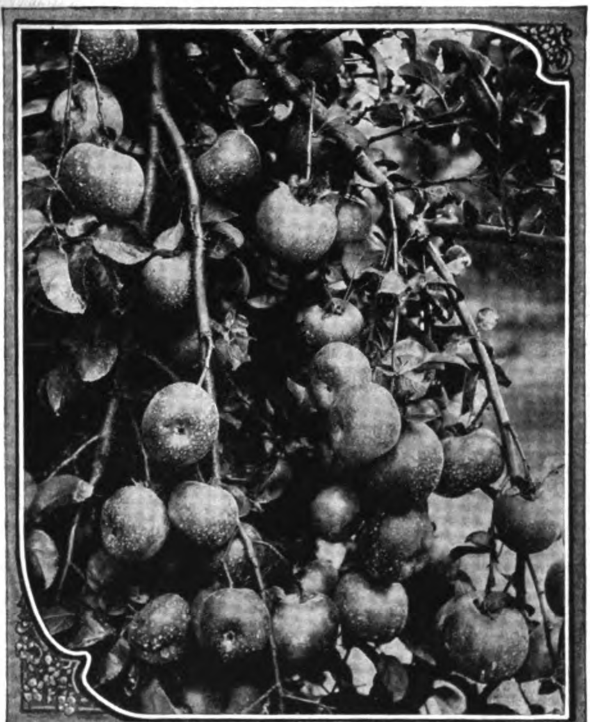
Soil and Location:

The apple will thrive in a wide variety of soils and climates and for that reason profitable crops can be grown on land that would otherwise be used for pasture only.

The general directions given in the preceding pages relative to the locating of an orchard should be observed in selecting the site for the apple

trees. The soil should not be lighter than a sandy loam because the light soils dry out easily and the apple is short lived under such conditions. The muck soils and the heavy white clay soils should be avoided but the clay loams are well adapted to apple culture.

The soils should be well drained and contain sufficient plantfood and organic matter to insure a strong, thrifty growth. A clay subsoil is to be preferred; care being taken to see that an impervious hardpan does not underlay the soil because such a condition would prevent the proper movement of the soil moisture and the deep penetration of the roots.



Some more of Mr. Craig's V-C'd apples. That Mr. Craig also sprays his apples well is plainly seen by closely observing the fruit, which still has the mixture clinging to it. V-C Fertilizers will produce greater yields for you and spraying will protect the yield from destruction by insects, etc.

The Young Tree:

The experience of good growers proves that one or two year old trees are most desirable for setting. Well grown one-year-old trees are preferred by most growers because the tops have not been crowded in the nursery row and do not suffer as much from transplanting as the older trees do. Do not use trees that are older than two years and see that all nursery stock is well grown and free from insects and diseases.

Planting and Care of the Trees:

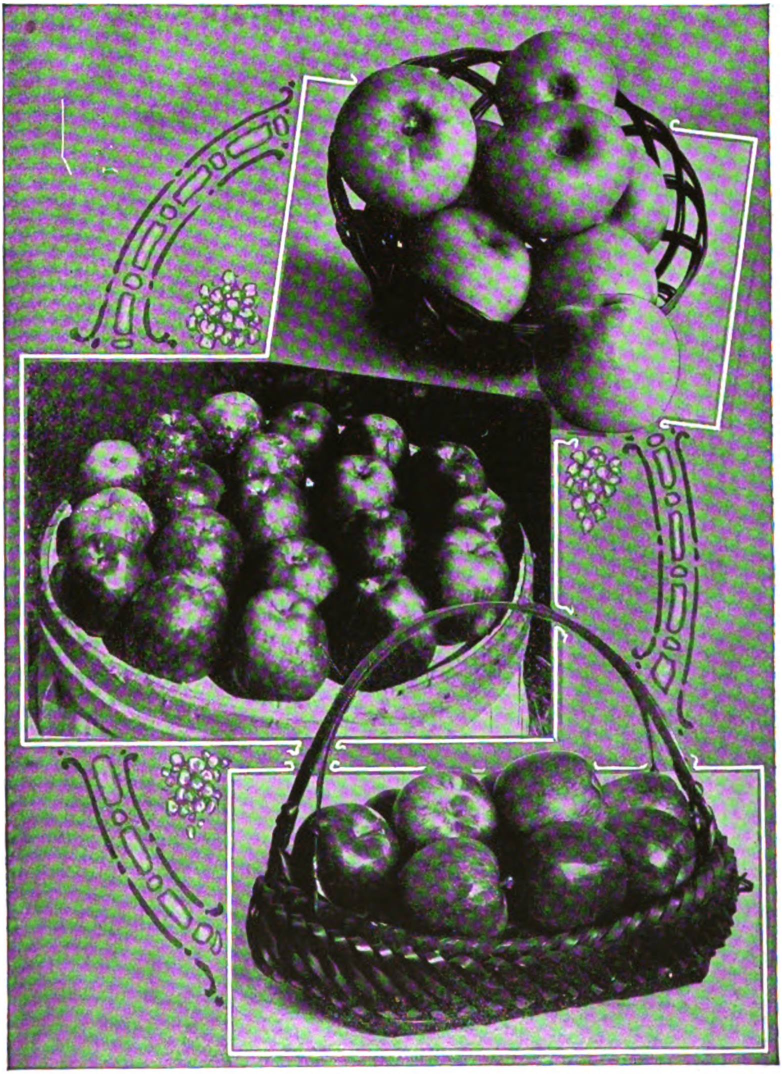
The square system of planting is usually adopted because it is easily laid out and most convenient to work after the trees become mature. It is not usually advisable to plant the permanent trees closer than thirty-five feet and most growers prefer to have them forty feet apart.

The orchardist must keep in mind the fact that a tree in heavy bearing requires a large quantity of available plantfood and sunshine and if they are crowded the yield of fruit will be reduced in quantity and quality. Some upright growing varieties such as the Yellow Transparent and Benoni may be set closer than the spreading varieties.

Setting a young apple tree by use of the planting board. The tree should be set 3 to 5 inches lower in the orchard than it was in the nursery row. Great care should be taken in packing the soil firmly around the roots so that every root is in close contact with fine soil.

The time of setting the trees has been discussed but it is safe to say that early spring is a good time to set trees in any section of the country. A crew of two or three men is usually used if a large number of trees are to be set and 300 to 400 may be set per day. Care must be taken to see that the broken roots are cut off and that the fine top dirt is packed tightly about the root system.

It is advisable to mix a pound or two of V-C Fertilizers with this top dirt before putting it around the roots because it will provide readily available plantfood for the young trees and insure a quick, steady growth.



Apples such as these are sure to bring the top-notch price on the market. The centre view shows 20 V-C'd apples that cover the top of a barrel. Those at the top are Colorado Greenings and those at the bottom are Stark's Delicious.

If yearling trees are used they should be pruned to a whip, leaving the tree about thirty to thirty-six inches high. Two year old trees have the head already started and the problem is to select about four well spaced branches for the main scaffold limbs and remove the rest.

The trees should be gone over each spring to remove the interfering and unnecessary branches and to keep the limbs well distributed along the trunk.

Putting the finishing touches to the planting. Soil is filled in around the tree and firmly packed down with the feet until it is a little higher than the ground. Caution must be taken in tramping down the soil not to injure or bruise the young tree.

Fertilizers:

One of the secrets of growing any crop, whether it be corn, hogs or fruit trees is to maintain a steady, thrifty growth and at no time permit this growth to be checked. This is particularly true of fruit trees and for that reason it is advisable to apply V-C Fertilizers to the trees, working it in the top soil so that it may become available to the plant. While the tree is making its growth, from three to twenty pounds per tree should be used, varying the amount with the age of the trees. The feeding roots of the tree extend out from the trunk farther than the branches and for that reason the fertilizer should not be applied close to the trunk; put it out far enough to supply the feeding roots.

Peaches

Northern and Western Grown

The business of growing peaches is rapidly becoming more popular and many new sections are proving to be adapted to the industry. The improvement of varieties and the marketing conditions have done much to stabilize the business and put it on a substantial foundation.

The importance of good soil management and proper fertilization is better understood than it was when a large per cent. of the peach orchards were allowed to go into decline and the proper application of these factors is making it possible for growers in less favored localities to produce profitable crops.

In this cleanly cultivated Peach Orchard note how the soil is hilled up around the trunks of the trees and also the fine example of soil mulch that is so essential to best results..

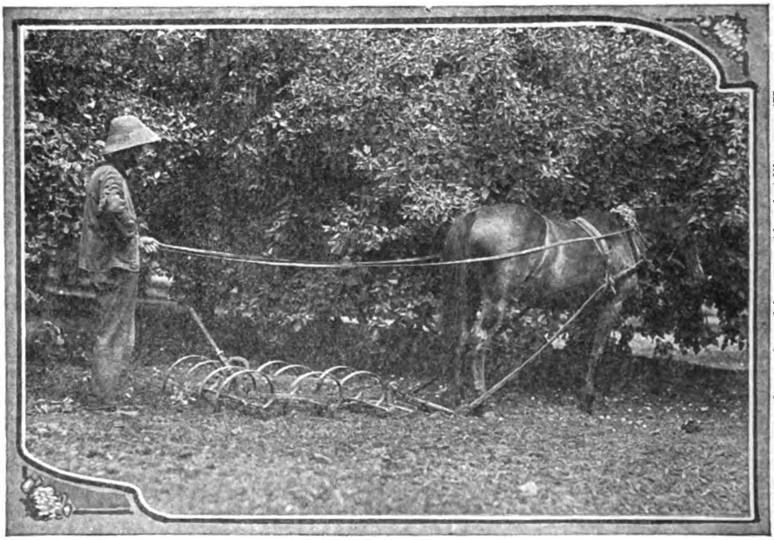
A peach orchard may be brought into profitable bearing in a much shorter time than most of the other fruits and that fact appeals to many farmers who are horticulturally inclined and have soil conditions which are adapted to the crop.

Inasmuch as the crop is very perishable, every care should be exercised in selecting the site and studying the soil and market conditions. There is a strong demand for peaches in all parts of the country during the entire peach season and this demand will continue to increase, as it has done in the past. No large plantings should be made, however, unless it is known that peach trees bear fairly regular crops in the immediate locality.

Site and Soil:

Every factor previously mentioned in regard to the location of an orchard should be carefully considered. It is especially important that good water and air drainage should prevail and that the land be level enough to permit clean cultivation during the greater part of the growing season.

The peach does well on many types of soil but seems to prefer the lighter loam soils. Excessively rich black soils and muck soils are not adapted to this crop because of the tendency to grow too much wood instead of bearing, and the danger of winter killing is increased. Soils of good



It is wise to cultivate as closely to the trees as possible. When weeds are growing around the base of the tree they are robbing the tree of fertility which should go towards making a greater yield and higher quality of fruit.

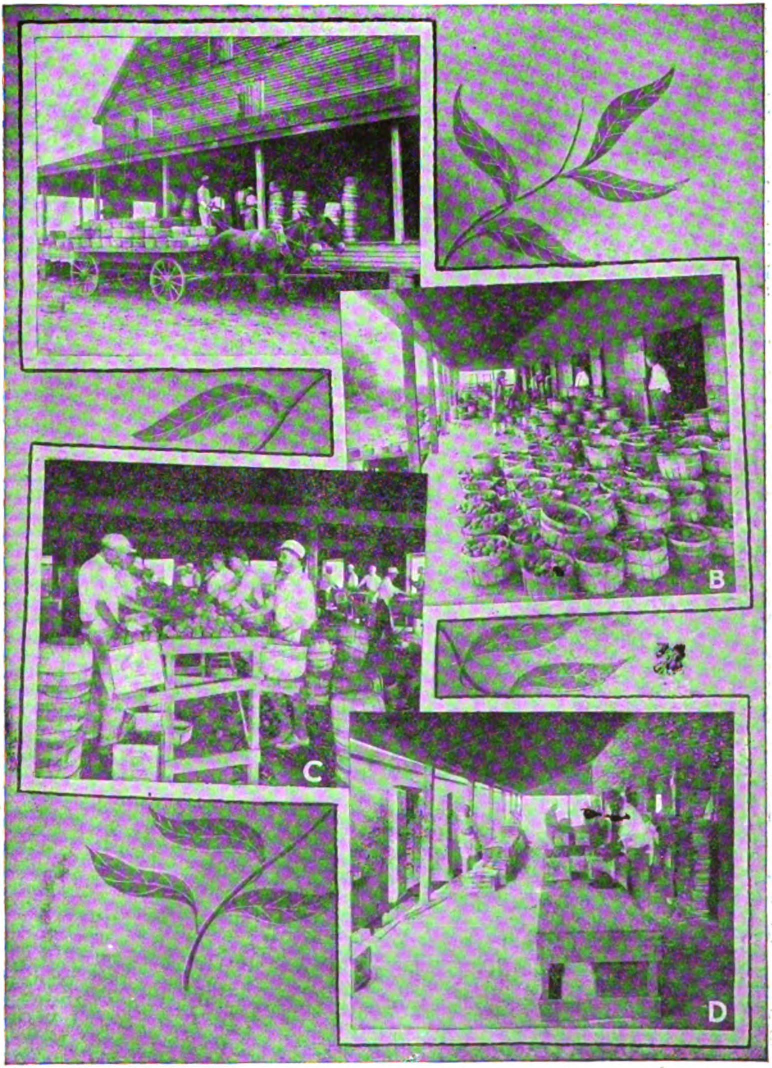
texture which may be improved by fertilizers and cover crops are much preferred to the very rich soils. Some very profitable orchards are located on thin gravelly soils as well as on the light sandy loams.

Soil Preparation:

The land in which the trees are to be planted should be plowed and cultivated thoroughly, making it like a garden seed-bed. This is important because the trees must make a prompt and vigorous growth.

Varieties:

When selecting the varieties it is important to keep the market preferences in mind unless the orchard is planned entirely for home use. The Elberta and other varieties of that type are generally preferred by the commercial shipper. For local markets and home consumption the more



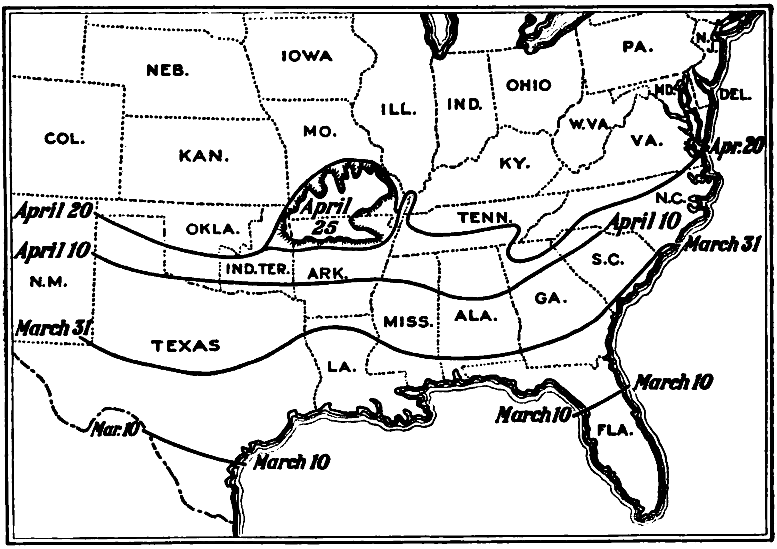
Views of a Peach Packing House of a V-C user.

A—Bringing in baskets of V-C'd peaches from the orchard.
B—Unloading the baskets from wagons onto the loading platform from where they are sent to the packers to be put in crates for the market.
C—Grading and packing peaches in crates for shipment to the markets.
D—The Peaches being inspected and the crates nailed and being carried into the cars. The price you will get on the market for your fruit will depend on the quality; and the amount of money you will get will depend on both quality and quantity. V-C helps you get both.

tender varieties having a wide range of ripening dates should be chosen. Consult the peach growers and the Experiment Station regarding the varieties to plant.

Nursery Stock:

It is advisable to plant one year old trees which are from three to five feet high and from one-half to three-fourths of an inch in diameter. The extra large trees suffer more from transplanting and are not as desirable as the medium sizes. The trees should be well grown, true to name, healthy and free from insects and diseases. Purchase your trees from a reliable nursery of established reputation early enough to secure good trees and prompt delivery. As soon as they arrive they should be unpacked, separated and heeled in carefully in a lot where animals cannot injure them.



Map showing by heavy lines the advancement of spring, and average dates of freedom from frost.

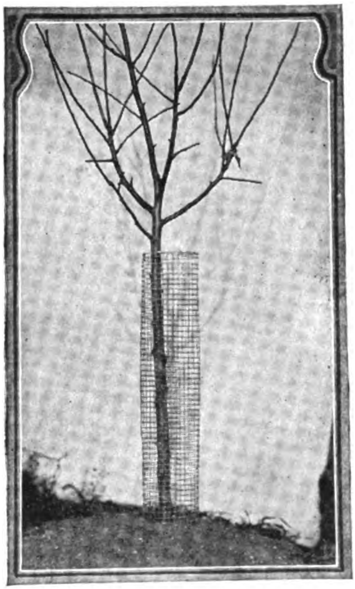
Distance of Planting:

One of the great mistakes in the past has been to plant the trees too close. On good soil the trees should not be closer than 24x24 feet but on the poorer soils they may be set 20x20 feet. Attention must be given this point because the roots soon fill the allotted area.

Fertilizing the Young Trees:

When young trees are removed from the nursery row a large number of feeding roots are broken and the root system is more or less handicapped

in furnishing a large supply of plantfood. In view of the fact that a quick and vigorous growth is essential to the best development of the tree it is recommended that 3 pounds of fertilizer should be applied per tree. V-C Fertilizers containing 2 to 4 per cent. of nitrogen, 8 to 10 per cent. of phosphoric acid and 6 to 8 per cent. of potash are especially well adapted to this use and will give the desired results. The peach tree bears fruit at an early age and needs a liberal application of these specially adapted mixtures of plant food to insure regular and profitable production.



An approved method of protecting young trees from being killed by the gnawing of small rodents. The wire netting is buried a few inches at the bottom to keep the small animals from burrowing and in that way reaching and damaging the tree.

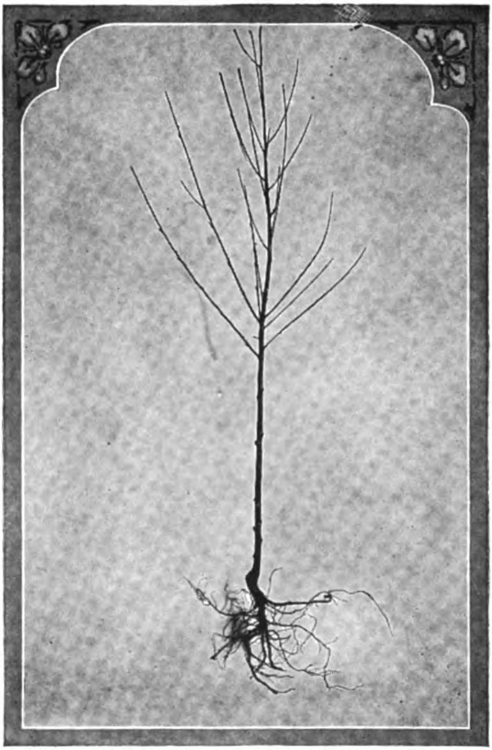
Considerable judgment should be exercised regarding the use of nitrogen. If the soil is thin or deficient in plant food, 4 per cent. of this element may be used, but if the soil is fairly rich 2 per cent. may be too much. If the annual growth does not mature well and shows the appearance of being rank, a fertilizer containing no nitrogen should be used.

The applications may be made in the spring on the young trees and worked well into the soil above the feeding roots. After the trees come into bearing a second application should be made during June.

Peaches make a heavy draft upon the soil and unless a sufficient supply is available the trees and the size of the crop will suffer. This plantfood will influence the crop of the following seasons because peaches are grown on the wood of the previous year's growth and the importance of this wood being properly developed and matured is evident to the thinking grower.

Time of Planting:

Spring planting of peaches is usually preferred. Localities having a late fall can set peaches in the fall.



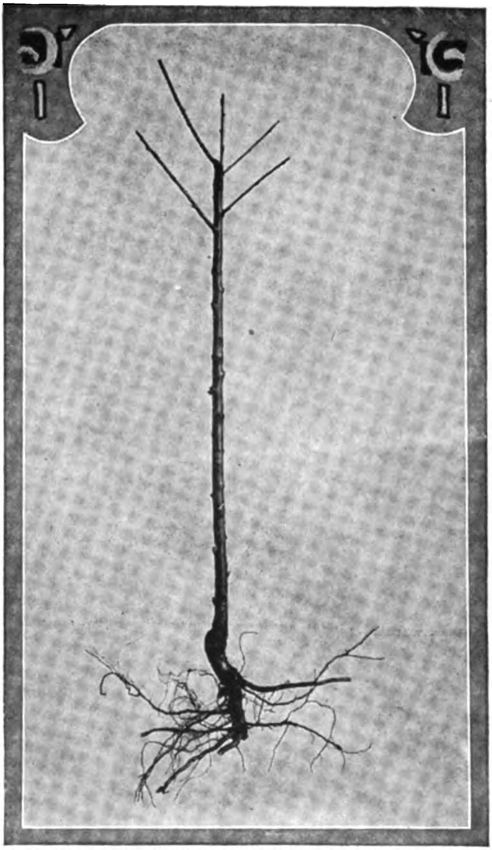
A well grown peach tree as it comes from the nursery; healthy and well shaped, but the branches are somewhat higher than is generally preferred.

Pruning:

The newly planted tree is cut to a whip 18 inches or two feet high. In the early spring of the second season the center is cut out and four to six lateral branches are selected as the scaffold limbs and these are severely cut back to outside buds. This starts the open head which is the most desirable type for the peach tree. Frequent and vigorous pruning is recommended because the interfering branches need to be cut out and the new growth stimulated so that a large per cent. of bearing wood may be secured.

It is customary to prune the trees in late winter or early spring. In bearing orchards it is often advisable to postpone pruning until after danger

of frost is past so that the pruning can be regulated according to the fruit in sight. If the crop has been killed, a severe pruning would be in order but if only a small proportion remains alive, very little pruning should be done.



The same tree as shown on the preceding page properly pruned and healed with broken and bruise roots cut away.

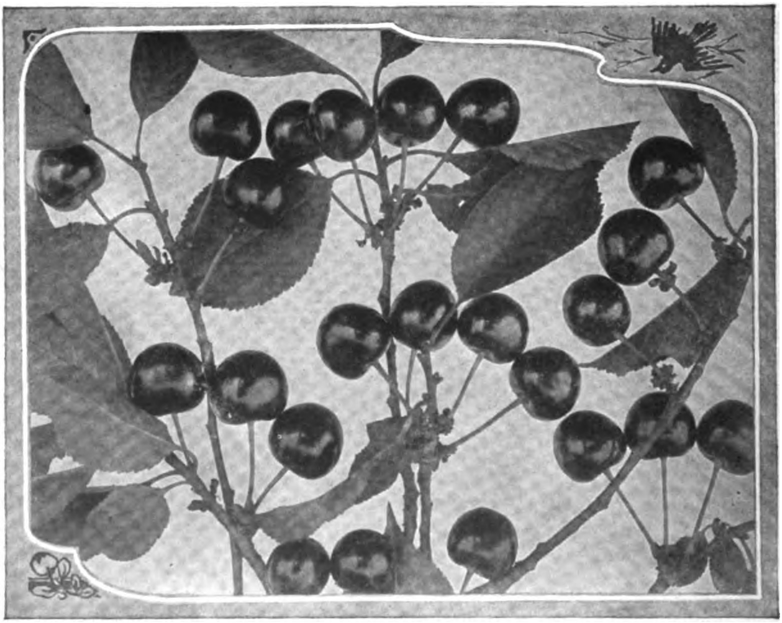
Cultivation:

Clean cultivation is almost necessary for the production of a satisfactory crop. The trees are rapid growers and mature their fruit in a comparatively short time, thus making a heavy demand upon the soil moisture and plantfood. Give thorough cultivation until late summer and sow a winter cover crop in August

Cherries

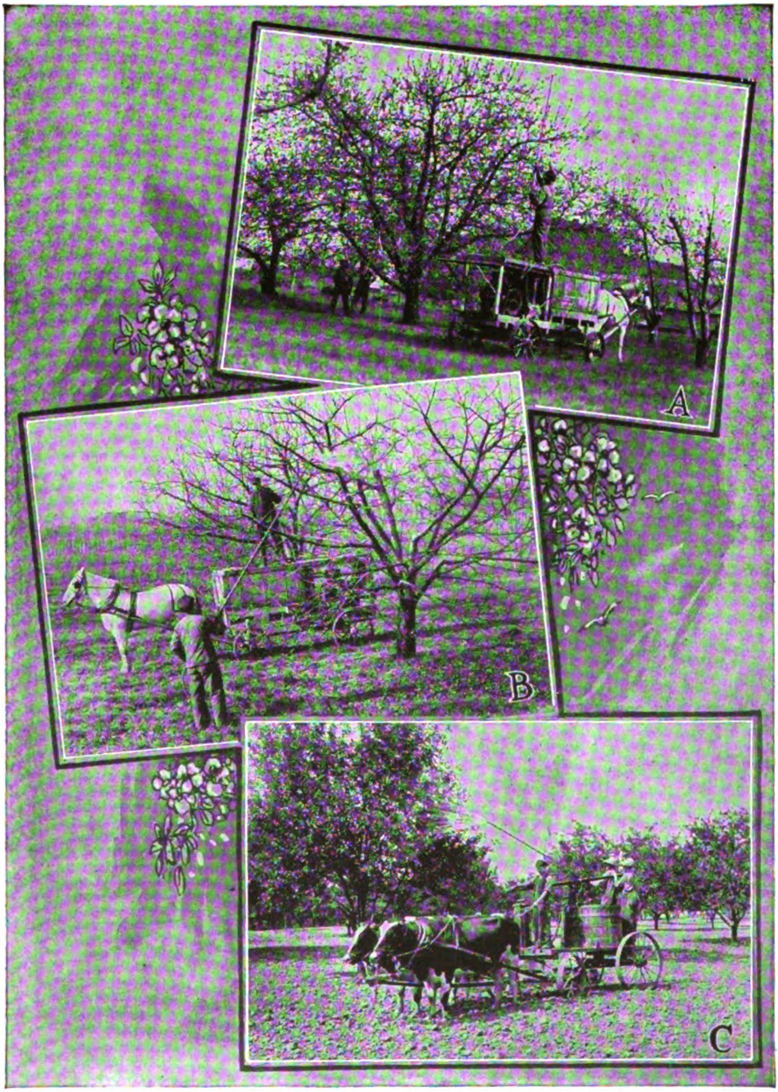
In recent years there has been an increasing interest in commercial cherry growing in the northern half of the United States and the industry is proving desirable and profitable when the orchards are reasonably near a good market.

The sour cherry has been grown in the home orchards of nearly every state of the Union, but the fact that it dislikes the very long, hot summers accounts for the small number grown in the Southern states. The cherry is a popular fruit because it comes on the market early in the season when tree fruits are in strong demand.



Of late years the cherry has come into its own as a commercial fruit. When the orchard is near a good market and the fruit is of the best quality and yield, a very profitable return is realized.

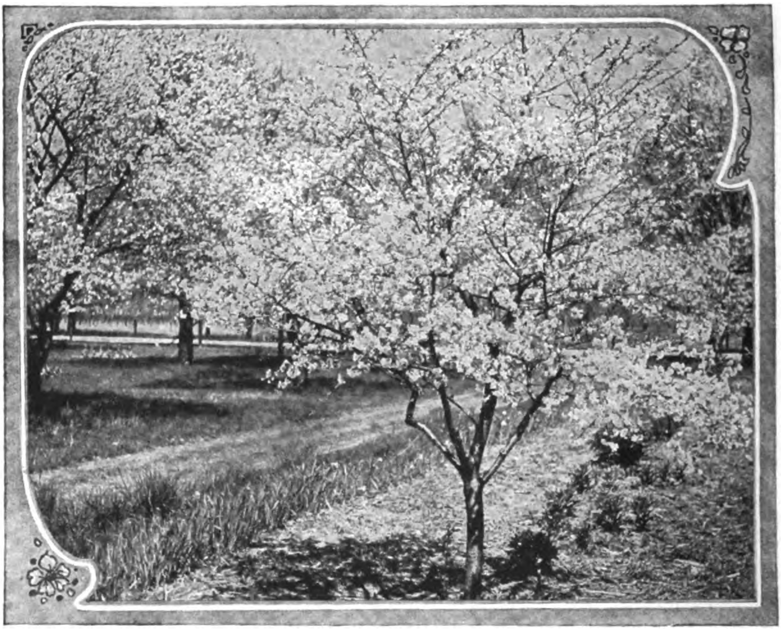
They are hardy and thrive on a wide range of soils provided they are well drained. Like the peach, the cherry is very sensitive to the ill effects of a wet soil. Sites that are particularly susceptible to early spring frosts should be avoided for a cherry orchard. A survey of the large cherry sections shows that localities enjoying the tempering effects of bodies of water are particularly favored. The same general conditions governing



A and B—Spraying an Indiana Orchard.
C—A strange rig, but the boys seem to know how to go about their spraying task.

the selection of an orchard site which were mentioned in the general discussion, should be followed. Market preferences in the community will influence the selection of varieties and the list decided upon should be referred to the State Experiment Station for their approval.

Growers usually prefer the one year old nursery tree but the two year old trees will give satisfaction if they are true to name and well-grown. The trees should be heeled in carefully when they are received. In sections where the winters are very severe, spring planting is to be preferred, while in the latitudes having mild winters the fall setting is preferable. Special attention should be given to the fact that the buds of the cherry tree swell very early in the season and the trees should be set before that time otherwise there will probably be considerable loss and disappointment. The sour



Small Cherry tree in Bloom. The cherry when properly handled is a big money crop. Fertilizer will not only increase the yield of your trees but will make the fruit larger, the meat firmer, improve the flavor and make the appearance of the fruit when properly packed most inviting.

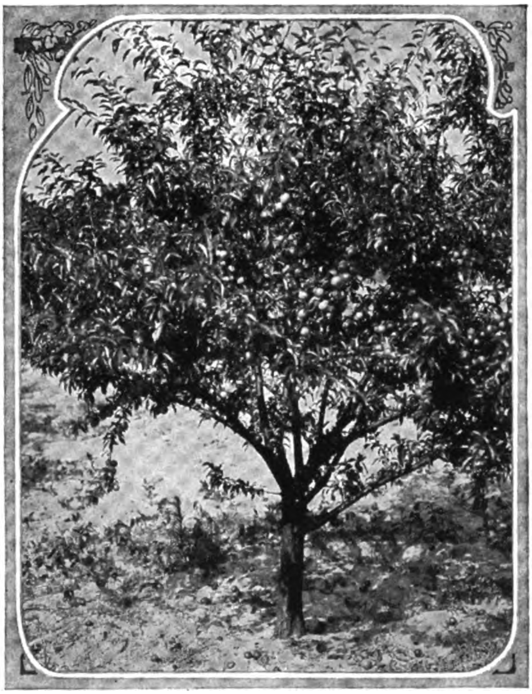
cherries should not be set closer than 20 ft. x 20 ft. and a distance of 24 ft. x 24 ft. would be much more desirable. Sweet cherries should be set about 30 ft. x 30 ft. because the trees demand more space than the sour ones.

The young trees should be given an application of two or three pounds of a high grade V-C Fertilizers containing 2 to 4 per cent. of nitrogen 10 to 12 per cent. of phosphoric acid and 6 to 8 per cent. of potash. As the trees advance in age the application should be increased accordingly.

The young cherry trees do not require much pruning, the principal aim being to select a few well spaced scaffold limbs, similar to the apples.

After these limbs are chosen, the principal work in the future is to keep the interfering branches, diseased wood and water sprouts out of the tree.

As a rule, the cherry orchard is given clean cultivation during the growing season, provided the land is not too rolling. This work is carried on as described for the apple, and the cover crop should be sown by the first of August. In this way the supply of organic matter can be maintained and, the physical conditions of the soil improved. Careful attention to cultivation, cover crops and proper fertilization will develop an orchard of strong, thrifty trees which will yield profitable crops of cherries.

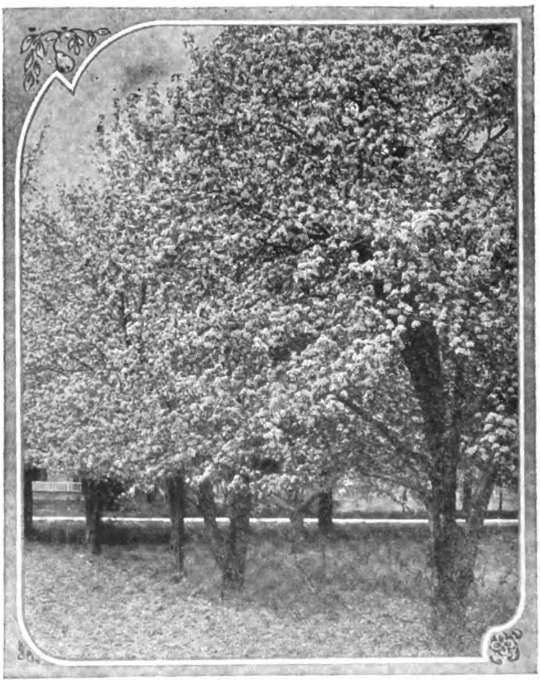


Yellow Plum Tree. The plum like other fruit trees does best in a fertile soil; liberal applications of fertilizer will add greatly to the yield and to the profits of the orchard.

In many sections cherries are attacked by insects and fungous diseases that reduce yield and the total profit from the crop. The proper use of fungicide and insecticides will control these troubles to a great intent. The direction for mixing these spray materials may be obtained from the Horticultural Department of your state Experiment Station. The method of harvesting the fruit must be given careful attention because if the cherries are to be shipped, they should be picked with the stems on. If there is a cannery in the neighborhood, the fruit can be picked without the stems providing they can be used immediately.

Pears

The pear has been grown successfully in nearly all parts of the United States but has not assumed the commercial importance that has been accorded the apple and the peach. There are many highly profitable pear orchards located in eastern states as well as in the sections bordering the Great Lakes. The disease and insect enemies of this fruit have caused many growers to become discouraged with the crop but in the light of present day information it should be possible to extend the successful culture of the pear into every state. The market demands good fruit. The demands of the pear are very similar to those of the apple and it will be sufficient to



Seckel Pear trees in bloom. The production of fruit-buds and fruit is greatly increased by proper fertilization and V-C is that kind.

mention the important conditions that need special consideration. The pear prefers a well drained clay loam soil, even though such varieties as the Kieffer and LeConte seem to do particularly well on the lighter loams. The selection of the site should be governed by the same general factors that are considered in planting the other varieties of fruits.

An important factor in financial success of a pear orchard is the proper selection of a few satisfactory varieties that are adapted to the locality.

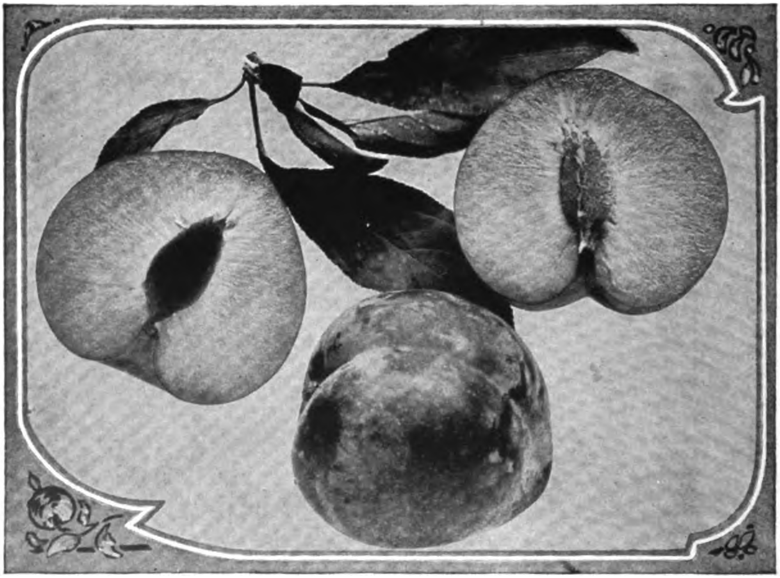
In buying the nursery stock one should avoid trees with soft green tops as they are undesirable. Care should be taken to plant the trees carefully and to have an inch or two of loose soil on top for a mulch to conserve the moisture. The young tree must be pruned after being set and this should consist of cutting off the branches which are less than three feet from the ground. This work should be done in the early spring before the buds begin to swell. The pruning after the first year should be limited to removing the sprouts, suckers and interfering branches. When the orchard is in full bearing some pruning must be given to open the tree up so the light may be admitted into the inside of the tree.

This Seckel Pear tree is a producer, and when your trees produce large yields of quality fruit and you are near a market there is sure to be a good profit for you.

The fertilization of the pear is an important feature in the development of a successful orchard. The production of fruit and fruit buds is greatly influenced by the supply of available plant food and the addition of suitable fertilizers will increase the yield and enhance the value of the crop. The pear tree is susceptible to the bacterial blight and for that reason stable manure and nitrogen must be used with caution. An over abundance of nitrogen will cause a rank growth of sappy wood which is easily killed by this disease and good judgment must be exercised in the choice of fertilizing materials. Young orchards on poor soils should have an application of two to three pounds per tree of a V-C mixture containing 2 per cent. of nitrogen,

10 per cent. of phosphoric acid and 6 to 10 per cent. of potash and the amount of the application should increase as the tree grows older, as is described in the case of the apple.

Some soils will grow a good tree without the aid of nitrogen and orchards on this type of soil should receive liberal applications of phosphoric acid and potash to properly balance the nitrogen in the soil. This will aid in the development of fruit buds and will pay an enormous profit on the investment.



Some excellent Plum specimens. Although not as popular as some fruits, the Plum Orchard can be made to realise handsome profits through proper care and liberal fertilisation.

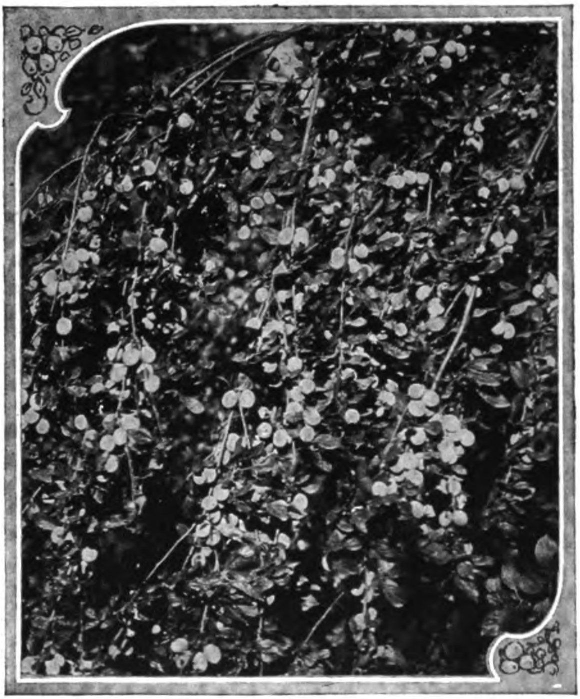
Plums

The large numbers of varieties of plums now growing in this country and the special adaption of these to the different types of soil makes it possible for any one who has a piece of well drained soil to enjoy this delicious and wholesome fruit. The great secret of plum growing is to get varieties that are adapted to the locality. This is possible if one will write their State Experiment Station for such information.

The Japanese plums, of which the Abundance and the Burbank are favorites, do well on light sandy and gravelly loam soils. The American and European varieties seem to prefer the clay loam soils. The Japanese varieties are particularly early bloomers and should be planted on a south-eastern slope if possible. Most other varieties will do well on any exposure. The specific purpose of drainage is to improve the mechanical condition of

the soil, warm and dry it during wet weather and keep it moist and cool during droughts. The plum trees should be set about twenty feet apart and some of the strong growing varieties such as the Domesticas should have twenty-five feet each way.

It is customary to plant two year old trees but in the case of some slow growing varieties three year old trees are set, however this must be done with caution. Like the peach, the plum orchard should be given shallow cultivation during the growing season and a cover-crop sown in the late summer.



Damson Blue Plums. A very popular variety for the market. For the highest yields and best quality use V-C Fertilizers in your orchard.

Fertilization:

The plum does best on a rich fertile soil and it is unquestionably true that a liberal application of complete fertilizer will add greatly to the yield and profit. The plum should have the same general treatment that has been recommended for the peach.

Pruning:

The individual habits of growth of the many varieties of the plum makes it next to impossible to give general recommendations regarding pruning practices. It is sufficient to say that very little pruning is required except for those varieties that tend to develop a very thick top. On these, such pruning should be given in the very early spring as is necessary to open up the top.

The plums should be given the sprays that are recommended by the Experiment Stations and if the plums usually begin to rot just about picking time it is advisable to give them an application of Bordeaux mixture about two or three weeks before ripening.

A few clusters of Delaware grapes which if grown properly and packed well will be a money maker for you. A few dollars worth of Fertilizer will increase the value of your yield many dollars.

Grapes

The grape is a favorite fruit in all parts of the country and every farm should have several vines. It provides a delicate fruit for the table as well as delightful grape juice, jellies, conserves and so forth. Too often the vines are neglected and soon become unproductive. Proper care and fertilization will make the grape one of the most productive and satisfying fruits on the farm.

The grape should be planted on a well drained soil on the higher lands to prevent injury by late spring frosts. In preparing land for grapes it is well to plow under a good application of manure, and work the ground deep and fine. The vines should be set about eight feet apart and may be planted in the spring or fall. It is customary to cut the roots back about one third and the top to two or three eyes. Firm the earth about the roots carefully to insure proper contact with the soil. If the soil is not rich, it is advisable to give the vines an application of fertilizer to insure good thrifty growth. The grape vine demands a large quantity of moisture and should therefore be given careful and frequent cultivation. If the land is too rolling to cultivate, the vineyard should be mulched in the same way as is recommended for other fruits.

The grape is borne on the new wood and for that reason the pruning and fertilization are important. After the young vine starts to grow only the strongest shoot should be saved and the others removed. When the vine has made a satisfactory growth, cut off all the buds below the place you

The vineyard needs cultivation the same as any other crop and also liberal fertilization. V-C Fertilizers have produced results for farmers throughout this country and its extensive use bears testimony to its high quality and productive results.

wish the head to be formed and leave about two buds at the head. During late winter of each year cut the lateral canes back to two eyes each. This will cause the vine to produce a strong growth of new wood. The fruiting shoots should be pinched back each summer as soon as the fruit has set and the water sprouts and suckers should be removed. 400 to 800 pounds of a V-C Fertilizer containing about 3 per cent. of nitrogen, 10 per cent. of phosphoric acid and 6 per cent. of potash should be applied per acre when the ground is first cultivated in the spring.

The varieties should be selected with care but the following ones are usually satisfactory for general planting. Brighton, Moore's Early, Worden, Concord, Catawba, and Niagara. The grapes should be given the regular application of Bordeaux mixture and arsenate of lead to prevent them from rotting.

Quinces

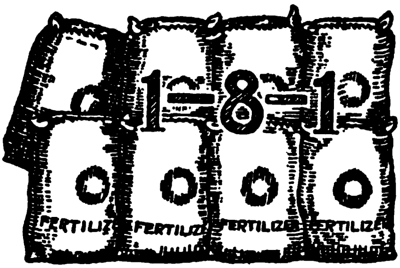
The quince is not grown extensively on a commercial basis but to those who are interested it is fitting to say that the fruit can be grown very profitably. Like the grape and many other fruits, it is important that the quince be planted on high, well drained soil, The "Orange" variety is one of the most satisfactory commercial varieties to grow and it is recommended that they be planted 20 ft. x 20 ft. Owing to the fact that the quince is very susceptible to blight, growers are usually forced to adopt the sod-mulch system of management as applied to the grape or apple. Quinces require a large amount of plantfood and should receive from 500 to 1,000 pounds of a well balanced complete fertilizer containing from 3 to 5 per cent. of nitrogen 10 to 12 per cent. of phosphoric acid and 6 to 8 per cent. of potash when the bushes are in bearing. The single stem method of pruning is usually adopted. This top is thinned out and held back for the first three years and then allowed to grow; the cutting being confined to thinning the head out as it needs it after the first few years.

INDEX

INDEX—Continued.

Fertilizers of
High Grade Analyses Save Time, Material, Labor and Money

Low Analysis



High Analysis

THESE two piles of fertilizer—eight bags on the left, five bags on the right—contain exactly the same amounts of plantfood.

High analysis fertilizer saves three-eighths, or more of the *freight cost*—freight on five tons or less, instead of on eight tons.

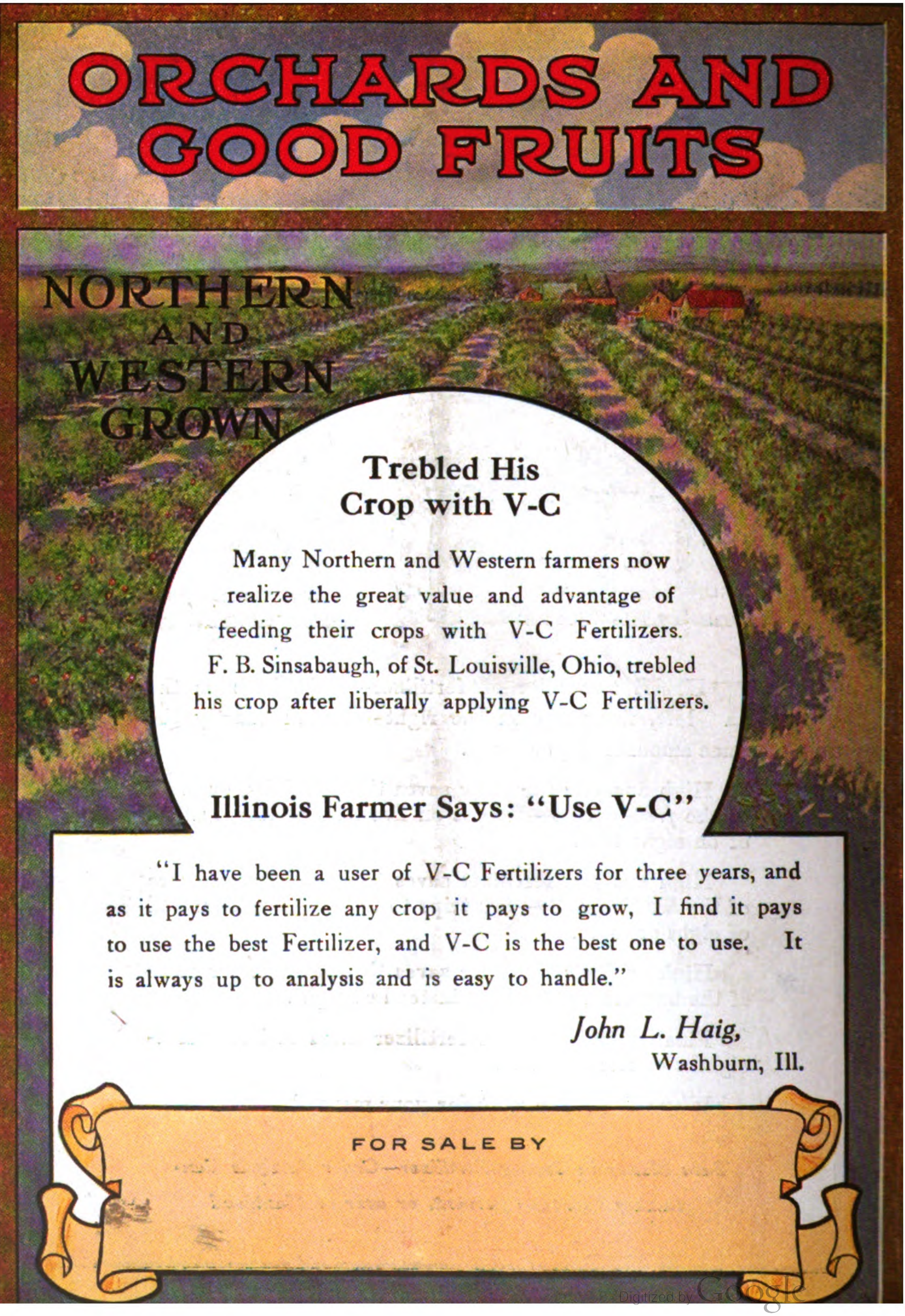
High analysis fertilizer saves three-eighths, or more of the *hauling costs*—five trips to the warehouse instead of eight or more.

High analysis fertilizer saves three-eighths, or more of the bag costs—five bags instead of eight.

Finally, high analysis fertilizer saves at least three-eighths of storage costs.

Why not get the most for your money?

Save Money in Buying Fertilizer—Order Analysis Containing Fourteen percent. or over of Plantfood


ORCHARDS AND GOOD FRUITS
NORTHERN AND WESTERN GROWN
Trebled His Crop with V-C
Many Northern and Western farmers now realize the great value and advantage of feeding their crops with V-C Fertilizers. F. B. Sinsabaugh, of St. Louisville, Ohio, trebled his crop after liberally applying V-C Fertilizers.
Illinois Farmer Says: "Use V-C"
"I have been a user of V-C Fertilizers for three years, and as it pays to fertilize any crop it pays to grow, I find it pays to use the best Fertilizer, and V-C is the best one to use. It is always up to analysis and is easy to handle."
John L. Haig,
Washburn, Ill.
FOR SALE BY

PEACHES

Published by
VIRGINIA-CAROLINA CHEMICAL CORP.
RICHMOND, VIRGINIA

High Grades of Fertilizers

Recommended by

The Soil Improvement Committee of the National Fertilizer Association.

Crop	Sandy Soil APA-A-P	Loam Soil APA-A-P	Clay Soil APA-A-P
Alfalfa, seeded down	10-2-4	12-2-2	12-2-0
Alfalfa, top dressing	12-0-4	12-0-2	16-0-0
Asparagus	7-5-2	7-5-2	7-5-2
Apples, sod orchard	7-5-2	8-6-0	8-6-0
Apples, tilled orchard	10-3-4	10-3-2	12-3-0
Barley	10-2-4	12-2-2	12-2-0
Buckwheat	10-2-4	12-2-2	12-2-0
Brussels Sprouts	10-3-4	10-3-2	12-3-0
Beets	10-3-4	10-3-2	12-3-0
Beans, garden	10-3-4	10-2-4	10-2-4
Beans, field	10-2-4	12-2-2	12-2-0
Blackberries	12-2-2	12-2-2	12-2-2
Corn, for grain	10-2-4	12-2-2	12-2-0
Corn, for silage	10-2-4	12-2-2	12-2-0
Clover, seeding	10-2-4	12-2-2	12-2-0
Clover, top dressing	12-0-4	12-0-2	16-0-0
Cabbage	10-3-4	10-3-2	12-3-0
Cauliflower	10-3-4	10-3-2	12-3-0
Carrots	10-3-4	10-3-2	12-3-0
Cucumbers	10-3-4	10-3-2	12-3-0
Celery	10-3-4	10-3-2	12-3-0
Grass, seeding	10-2-4	12-2-2	12-2-0
Lettuce	10-3-4	10-3-2	12-3-0
Millet	10-2-4	12-2-2	12-2-0
Meadow, top dressing	7-5-2	8-6-0	8-6-0
Mangels	10-3-4	10-3-2	12-3-0
Melons	10-3-4	10-3-2	12-3-0
Oats	10-2-4	12-2-2	12-2-0
Onions	8-2-8	8-2-8	8-2-8
Permanent Pastures, top dressing	12-0-4	12-0-2	16-0-0
Parsnips	10-3-4	10-3-2	12-3-0
Potatoes, late	10-3-4	10-3-2	12-3-0
Peas, field	10-2-4	12-2-2	12-2-0
Peas, garden	10-3-4	10-2-4	10-2-4
Peaches	7-5-2	8-6-0	8-6-0
Rye, fall seeding	10-2-4	12-2-2	12-2-0
Rye, spring top dressing	7-5-2	8-6-0	8-6-0
Rutabagas	10-3-4	10-3-2	12-3-0
Raspberries	12-2-2	12-2-2	12-2-2
Sweet Corn	10-3-4	10-3-2	12-3-0
Sugar Beets	10-3-4	10-3-2	12-3-0
Spinach	7-5-2	7-5-2	7-5-2
Strawberries, spring setting	10-3-4	10-3-2	12-3-0
Strawberries, top dressing	7-5-2	8-6-0	8-6-0
Squash	10-3-4	10-3-2	12-3-0
Timothy, top dressing	7-5-2	8-6-0	8-6-0
Turnips	10-3-4	10-3-2	12-3-0
Tomatoes, cannery	10-2-4	10-2-4	10-2-4
Wheat, fall seeding	10-2-4	12-2-2	12-2-0
Wheat, spring top dressing	7-5-2	8-6-0	8-6-0

PEACHES

One of Natures Luscious Products.

PEACHES

Published By

AGRICULTURAL SERVICE BUREAU

VIRGINIA CAROLINA
V-C Fertilizers
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V-C AGRICULTURAL SERVICE BUREAU.

Although the supply of plant food a soil is able to furnish is one of the determining factors in crop production, other conditions are quite as important. Plants must have for their home a soil that is well drained, that is in good physical condition and that is not too acid. These conditions must be corrected in order to get the best results from the use of fertilizer. Further, the preparation of the soil, the kind of seed used, and the methods of cultivation may vitally affect the yield of the crop.

The Virginia-Carolina Chemical Company recognizes these facts, and in order to aid the farmer in securing the best results in growing of crops, has provided within its organization an

AGRICULTURAL SERVICE BUREAU

directed by a practical and scientific agronomist, who will give personal attention by letter to any question pertaining to soils and crops the reader desires to ask. This service is free.

AGRICULTURAL SERVICE BUREAU
Virginia-Carolina Chemical [redacted] Corp.
Richmond, Virginia.

INDEX

PEACHES

The peach is the most widely planted fruit in the United States, and while the areas that are adapted to commercial plantings are restricted, we find the demand and interest in the fruit continually increasing. More than three-fourths of the states have peach orchards of commercial importance and practically every state has plantings for home use.

The fact that peach trees grow quickly and that some orchards produce very large and attractive profits has led people to the conclusion that the crop can be produced without much trouble or preparation. This condition has been augmented by the fact that many productive orchards are found on relatively light soil that is not well adapted to profitable crop production. By giving this problem careful study it will be seen that commercial ventures in peach growing should not be attempted except after a most careful and thorough investigation of every factor that contributes to the successful establishment of a profitable peach orchard.

INTERCROPPING WITH CANTALOUPES

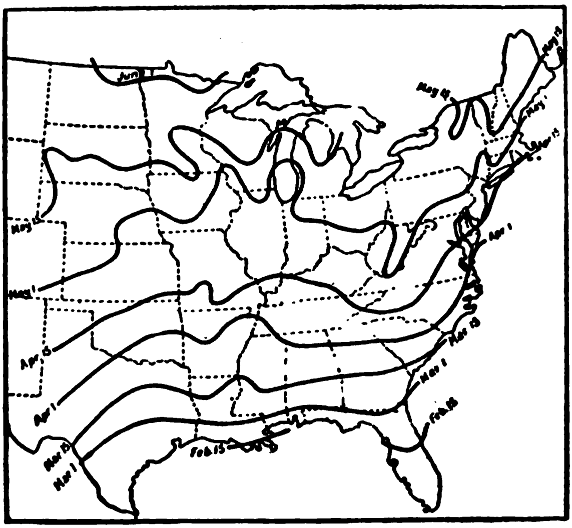
With good management and care the intercropping practiced before the orchard comes into bearing will pay all the expenses of the orchard and often give a profit. Proper care includes feeding. Trees and crops fed with an abundance of V-C Fertilizers give a heavy yield of vegetables and fruit.

The growing and handling of a small commercial peach orchard fits in well with the management of a general farm and the overhead charges against the orchard will not be as great as when the orchard is the main industry. The expense of growing and handling a crop of peaches is about $100.00 per acre per year after the trees come into bearing if taxes, team labor, and man labor are charged against the crop. This does not mean however, that the cash outlay is nearly as large.

It is true that proper orchard management and intelligent spraying have done much to overcome some of the causes for past failures, but even these advances in science cannot improve one's opportunities for success unless every consideration is given to the choice of location, kind of soil and the wise selection of varieties. It is necessary, therefore, to discuss these questions carefully so that future plantings may be made with a full understanding of the requirements of the crop.

CONDITIONS AFFECTING LOCATION

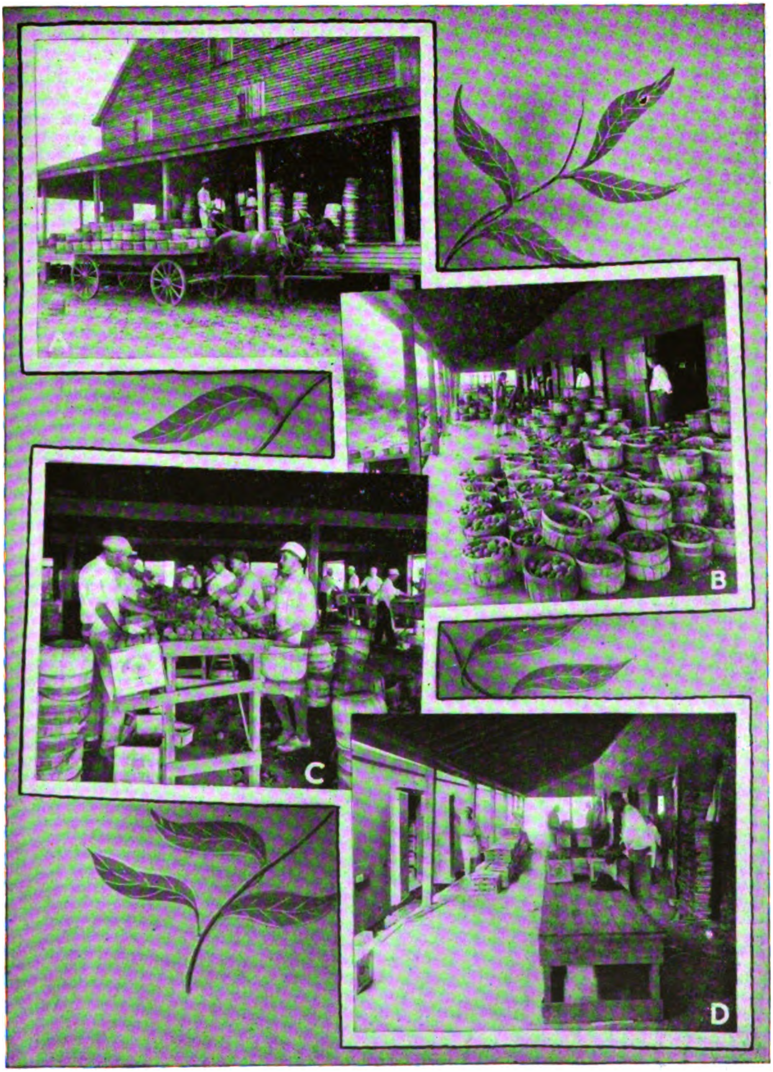
The location of a peach orchard must be analyzed with reference to its general surroundings, the climatic conditions that prevail from year to year, the soil types, transportation facilities and markets. If any of these factors are unsuited to commercial peach culture, the success of the venture will be affected.



FROST MAP
Average Date, Last Spring Frost.

Climate:

Weather conditions have probably caused more peach orchards to be unprofitable than any other one thing. Winter-killing of the buds or of the wood destroys the crop prospects for one, two or more years, or may entirely kill the trees. It is, therefore, important to get the weather records from the nearest weather bureau station for several years past and study them. Under most conditions, twenty degrees below zero will kill peach wood or cause serious winter injury and fifteen degrees below zero usually kills the fruit buds, and if such temperatures occur occasionally, in the section under consideration, success is doubtful.



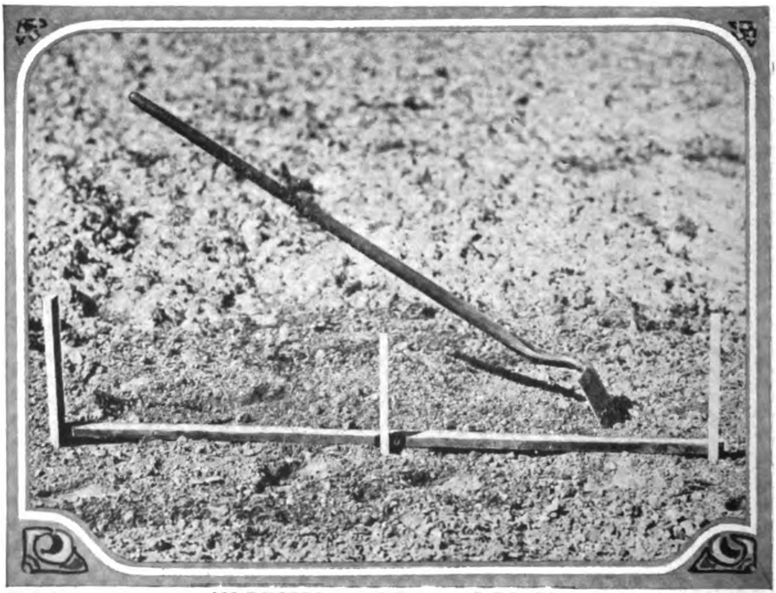
PACKING HOUSE

A—Unloading platform.
B—Baskets as they come from the field.
C—Grading and Packing.
D—Shipping.

Late frosts in the spring and early frosts in the fall may ruin the crop and it is advisable to request from the State Horticultural Society and the Experiment Station the blooming and ripening dates of the different varieties that are recommended. Study this with the weather reports and determine to the best of your ability the chances for success.

An investigation should be made, by visiting the farmers and fruit growers of the surrounding country, and evidence collected regarding the behavior of the peach in that community. Find out what varieties bear most regularly and determine the past history of the crop in that section.

Proximity to large bodies of water improves the location of an orchard because lakes influence the temperature changes and make the climate more uniform. The possibility of hail storms in spring or summer should be investigated and the direction of the prevailing winds should be determined. Rainfall sufficient for ordinary crop production will suffice for peaches if the orchard is cultivated properly.



AN EXCELLENT PLANTING BOARD

The middle stake, fitting in the notch in the board, marks the center of the hole to be dug for the tree and is in line with the stakes marking other trees in the row and that at right angles to it.

Markets:

The peach is a perishable crop and must be marketed in good condition if a reasonable profit is to be expected. This makes it necessary that the supply and demand of the available markets be studied so that the crop will not be put on a slow or glutted market. Improved shipping fa-

cilities have made it possible for peach growers to expand their market to large cities within the radius of several hundred miles. It is always desirable to develop and improve a good local market, if possible, because it eliminates the loss and delays which often occur when shipping to distant markets.

Transportation Facilities:

The orchard should be situated near a good shipping point if the local markets will not consume the crop. Freight rates and the frequency of service to the leading markets should be looked into and the possibility of obtaining satisfactory refrigerator car service is important if long shipments are contemplated. It is well to keep in mind that the grower must pay the freight and high rates should be avoided if possible.

DIGGING THE HOLE

To dig the hole the board and middle stake are removed, care being taken to have the center stake mark the center of the hole.

There should be good roads from the farm to the shipping point because fruit that is subjected to rough handling or hauling will not arrive on the market in first class condition. Jolting or jamming injures the fruit, disturbs the pack, mars the package and should be avoided. Long hauls are slow and expensive and it is advisable to select a location near to shipping point, if possible, even though the land may cost more.

Labor Supply:

If the peach orchard is to be large the availability of the labor supply is an important consideration. During the picking season considerable extra labor is always needed and if the supply of local labor is not sufficient to meet the demand, pickers must be imported from some other section for the harvest period.

Soil:

While the peach can adapt itself to a variety of soil types, it is evident that the sandy loam soils containing a fair mixture of silt and organic matter give best results. Peach trees demand that the soil be drained well to provide good aeration for the root system and to make it warm up readily

SETTING THE TREE

When the hole is dug, the planting board is replaced. The middle notch marks the place the tree is to be set. The roots are spread in their natural position and loose earth sifted about them and packed down tightly. The best position of the tree is vertical, or slightly inclined toward the prevailing winds.

in the spring. The subsoil should have good natural drainage and in no case should a site be selected which has an impervious hard pan under the soil. It is not uncommon to find excellent peach orchards on clay loam soils which are properly under-drained and which contain sufficient organic matter to make the soil friable and loose. A warm, loose soil tends to make the trees more hardy because it produces a strong, well matured growth. A

soil which is extremely dry or very wet during the winter season may cause the trees to winter-kill and such sites should be avoided. Soils which are very rich, particularly in nitrogen, such as muck and black sandy soil, should not be planted to peach trees because the rank, sappy growth of wood does not mature and winter-killing results.

The soil should not be too poor because poor development of the trees will result, but a soil of the proper texture which is lacking in fertility can be improved by the use of fertilizers, stable manure and cover crops and made to produce excellent crops. Such a soil would be more desirable than one which was too rich. Heavy clay soils are not desirable for peach growing because the water does not percolate through them readily and conse-

FILLING THE HOLE

The earth should be packed down continually as the hole is filled. Tramping with the feet is best. Care must be taken not to bruise the roots but pack the soil well, filling all the space. The firm packing of the soil around the roots is one of the most important factors in successful tree planting.

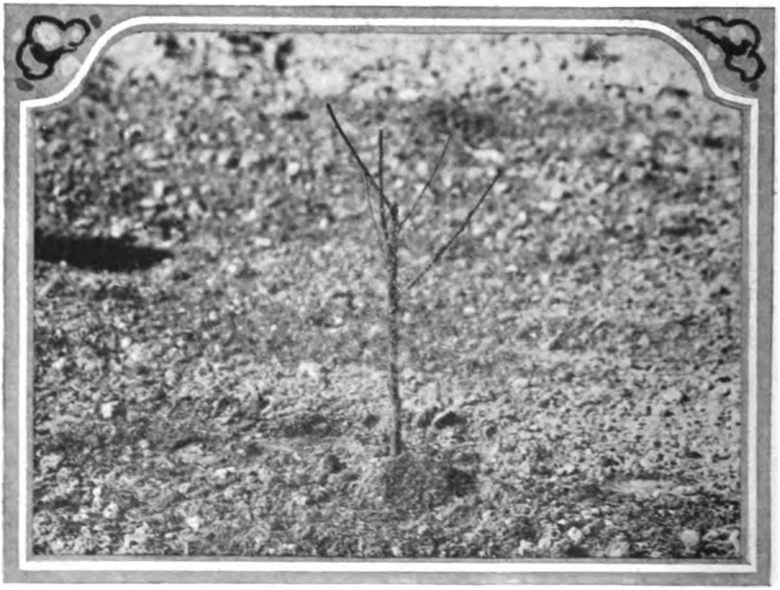
quently the roots do not get enough air. As previously mentioned, winter-killing is more frequent on such soil types. It should also be mentioned that alkali soils should be avoided.

Orchard Site:

In choosing the particular location for the orchard it is important that the site should be higher than the surrounding ground. Cold air flows from the higher land to lower levels and collects in the lowlands, valleys and

pockets. For that reason there is less danger of frost injury if the lowlands are avoided. Gentle slopes insure good air and surface drainage and may be used successfully if other conditions are satisfactory. Sites which are protected from the prevailing winds are very desirable because the effects of the winter winds are not so severe and considerable danger of loss is avoided while the trees are ladened with fruit.

Steep slopes are not well suited to peach culture because the land must be cultivated and there is serious danger of washing on land that is quite rolling.

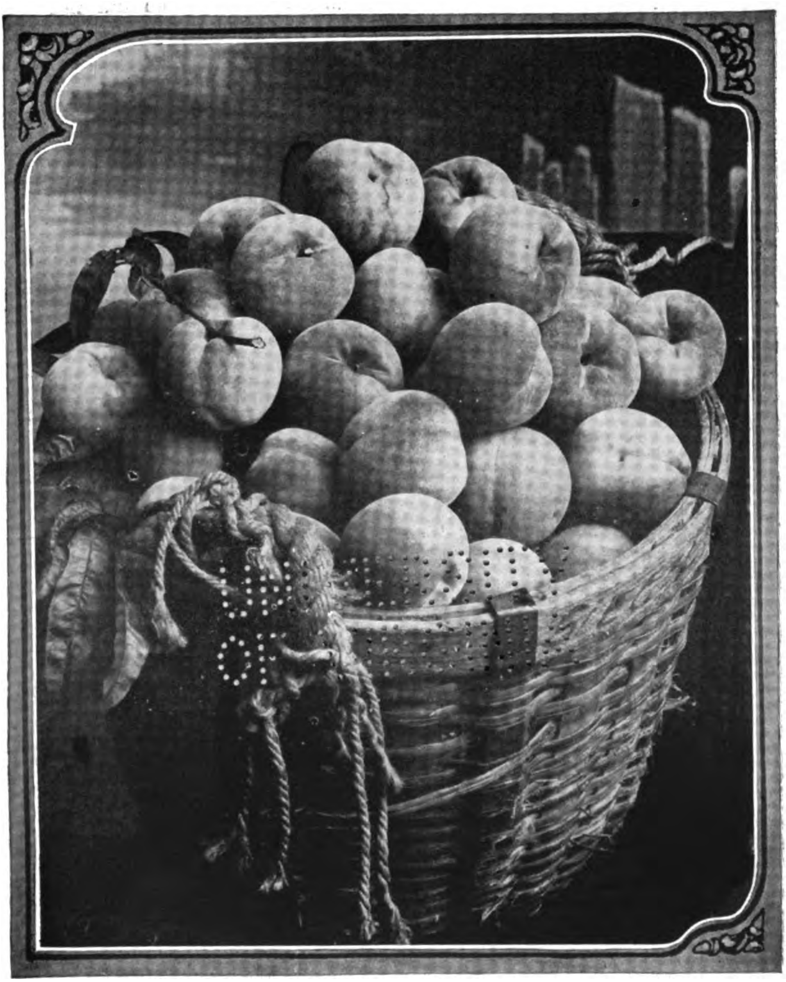


CORRECTLY SET

The first warm days of spring will cause many shoots to come out, and the surplus shoots must be rubbed off, leaving only the strong ones near the ends of the shortened branches. These young shoots are to form the head of the tree and should be distributed equally about the trunk.

SELECTION OF VARIETIES.

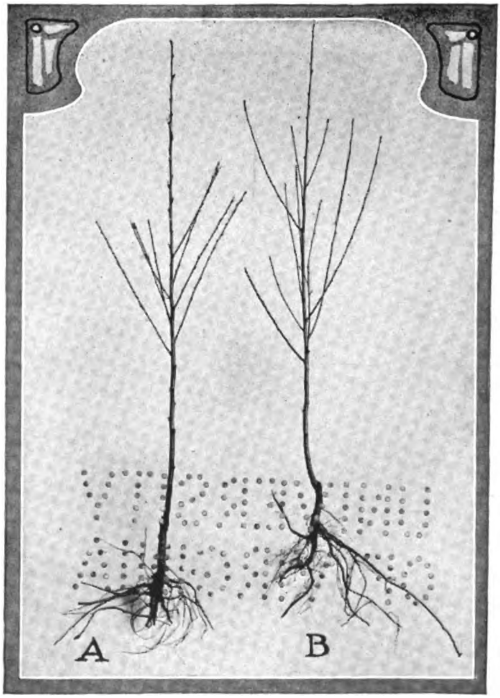
After choosing a site that is satisfactory in regard to soil, climate, markets and transportation facilities, there remains the important task of selecting the varieties to plant. The financial success or failure of the undertaking will be influenced by the choice of varieties made, even though the site may be admirably adapted to peach culture, and no amount of work will atone or rectify mistakes made in the selection.



NATURE'S MASTERPIECE

Such fruit are synonymous with large profits. If you are not getting them, use V-C Fertilizers to improve the quality of your crop.

It is desirable to solicit the advice of the State Experiment Station and the State Horticultural Society when studying this problem. The experience of growers in that community should be obtained and also the market demand carefully studied.

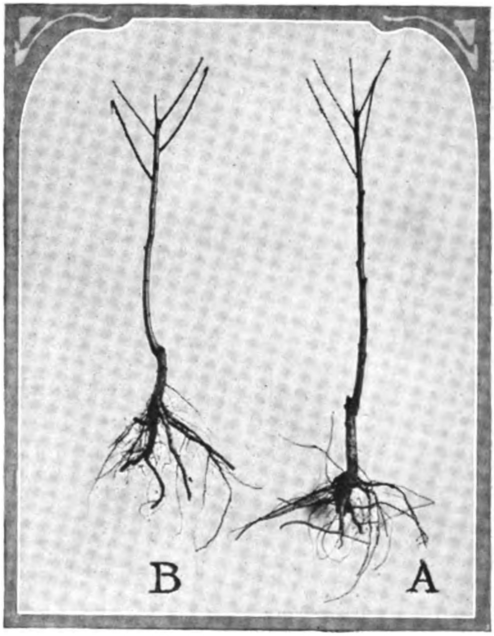


NURSERY STOCK

B to be shortened to 12 inches and A to 16 inches. When set they will be headed 8 to 12 inches, respectively, as they are set 4 inches deeper in the orchard than in the nursery. These trees, properly pruned are shown on the opposite page.

For use in the home orchard the selection of varieties ripening from early season till late will provide the greatest variety for the table. The commercial orchard, however, should only contain from one to four or five sorts and these must fill a definite place in the harvesting and marketing scheme. Some sections are known for a particular variety and in such cases it may be chosen, or if labor conditions are unsatisfactory a later or earlier variety may be planted.

The varieties chosen should be standard market varieties if the crop is to be sold on the large markets and they should ripen at a time when the proposed market is not well supplied with peaches from other markets. It would hardly be profitable for a Maryland grower to market an early variety in New York while the Georgia crop of Elbertas was at its best. By carefully studying Farmers Bulletin 918 of the United States Department of Agriculture it will be possible to know the approximate ripening dates of the popular commercial varieties of the country. The commission dealers may make helpful suggestions to an interested grower.



READY TO SET

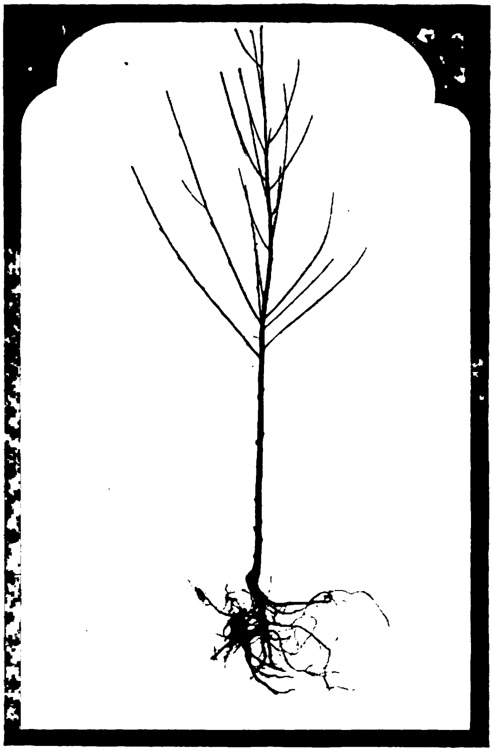
The Trees shown on the preceding page after pruning. The bruised and broken roots are cut away leaving smooth wounds which heal quickly.

The varieties must be adapted to the locality. Peaches that do well on one soil may be complete failure in another locality and soil. But we may be encouraged by the fact that the experienced growers in different parts of the country name many of the varieties mentioned in this booklet as being desirable in their sections.

Very large commercial peach orchards contain varieties that ripen successively so their labor may be employed more profitably. This is possible because the grower can ship carloads of each sort, but the small grower marketing his crop in a large market should reduce the number of varieties

so that he can ship in carload lots. A good local market makes this unnecessary and more varieties may be used. Experience seems to indicate that the larger markets prefer the yellow peach, while the smaller towns close to good orchards accept white peaches of more delicate quality.

New varieties that are not established on the market should not be selected for extensive planting. The nursery catalogs protray beautiful and alluring pictures of new sorts but they should be tried out thoroughly before being planted for the market.

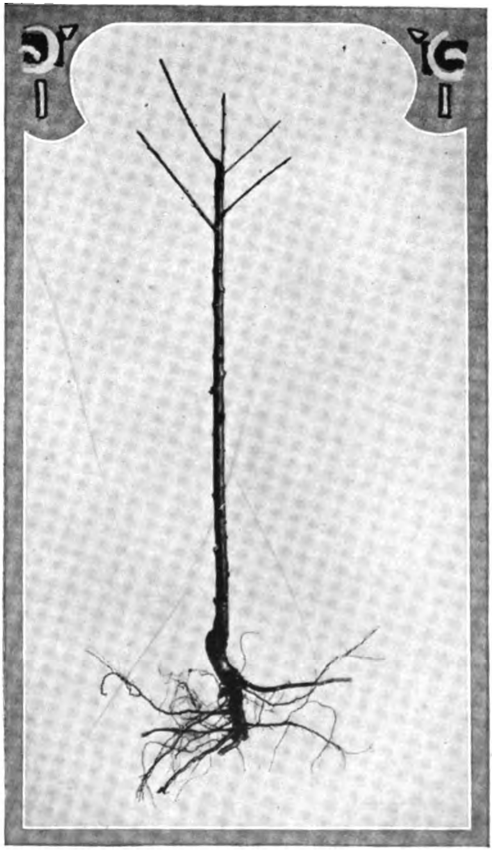


A NURSERY TREE
Although healthy and well shaped, the branches are higher than most orchardists prefer.

Generally speaking, the markets prefer the Elberta type of peach because of its size, color and shipping qualities.

The following list suggests a few of the proven varieties in their order of ripening and will serve as a basis for the selection of standard market peaches:

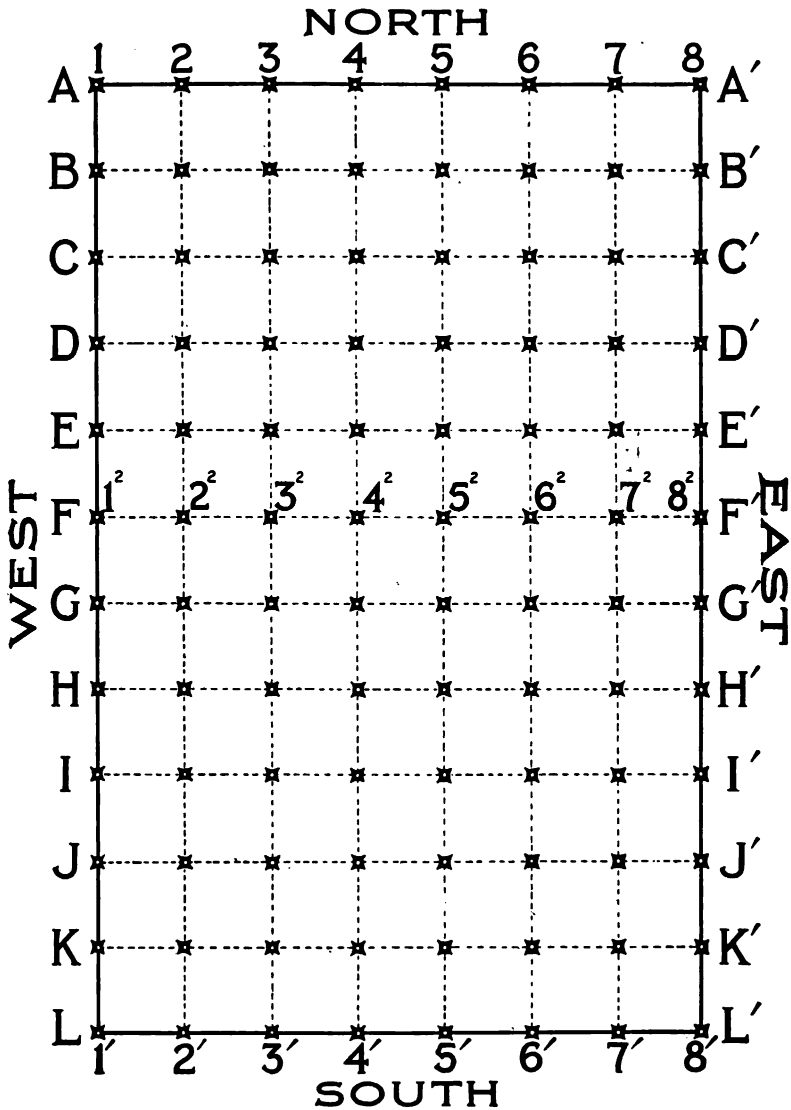
Greensboro, free-stone and white flesh; Carman, semi free-stone and white flesh; Mountain Rose, free-stone and white flesh; Early Crawford, free-stone and yellow flesh; Champion, free-stone and white flesh; Belle of Georgia, free-stone and white flesh; J. H. Hale, free-stone and yellow flesh;



PROPERLY PRUNED

The tree on the preceding page ready for setting.

Elberta, free-stone and yellow flesh; Oldmixon Free, free-stone and white flesh; Late Crawford, free-stone and yellow flesh; Crosby, free-stone and yellow flesh; Salway, free-stone and yellow flesh.



PLANTING DIAGRAM

NURSERY STOCK.

Every grower who has the future success of his orchard at heart will buy his young trees very carefully. Medium sized, well grown, one year old stock is preferable. These trees are more easily handled than those of larger size. They offer the grower a better opportunity to develop the type of head he desires and do not suffer so much from transplanting. It is important that the trees have strong, well developed root systems and that the entire stock be free from infection of diseases of injurious insects. Examine the trees for borers and crown gall when they are received. They should indicate by their appearance that they have been well grown and properly cared for after being dug from the nursery row. It is folly to buy short, poor quality trees because such economy will jeopardize the success of the undertaking. A few dollars extra will provide thrifty trees that will soon pay for themselves.

Much depends upon the reputation and reliability of the nurseryman. The purchaser should investigate the reputation of the dealer and buy only from a firm of known standing.

CARE OF THE NURSERY STOCK.

When the trees are received from the nursery they should be unpacked immediately, if not frozen, and heeled-in unless it is possible to set them immediately. A trench or furrow may be opened up with a plow and the trees carefully separated and laid in the trench in a slanting position with the tops to the south. The roots and crowns should be covered with fine dirt which should be worked between all the rootlets to prevent them from drying out. Firm the soil about the roots.

Trees received during severe freezing weather should be allowed to thaw out before unpacking.

A tight fence should be around the place where the trees are heeled-in to prevent rabbits from gnawing them.

PREPARATION ON THE LAND.

The land should be carefully prepared by deep plowing and thorough cultivation. If the land is in sod it should be plowed early enough to permit the sod to decay before planting time. The disc should be used before plowing to break up the surface and its use should be continued frequently after the land is broken. The same care should be exercised in preparing the land for peaches that is practiced in making a seed bed for a grain crop.

If the soil is shallow and in poor condition for the production of ordinary crops, it should be plowed deep, subsoiled and the surface pulverized by harrowing. If the soil is not productive it is well to anticipate the planting of the orchard by six months or a year and, in the meantime, sow to some leguminous crop such as cowpeas and soybeans in summer and crimson clover or vetch in winter. These preparatory crops should be given the best of care and abundant growth induced by fertilization at the rate of 400 to 600 pounds of commercial fertilizer analyzing 8 or 10 per cent of Phosphoric Acid one per cent of Nitrogen and 2 to 4 per cent of Potash.

If a thin layer of hard pan underlays the surface it would be advisable and profitable to dynamite this layer to facilitate moisture movement and root development.

SETTING THE PEACH TREES.

Distance Apart:

One of the notable evidences of poor judgment in orchard management is setting the trees too closely together. Experience is proving that peach trees should not ordinarily be set closer than 20 by 20 feet and upon good sandy loams 25 by 25 feet is preferable. It is just as impossible to get maximum production from trees which are set too closely as it is from corn which is planted too thickly in the row.

Planting Plan:

The square system is usually used in laying out an orchard because it is more easily done and the trees can be cultivated, sprayed and worked more advantageously than in an orchard planted according to the triangular system. However, occasionally the contour of the land or shape of the plot is such that makes the triangular plan more desirable. The triangular system is more economical of land, making it possible to plant about ten per cent. more trees than by the square plan, but this advantage is overbalanced by the inconvenience of working in the orchard after the trees mature.

The square system makes it possible to set 108 trees per acre 20 by 20 feet. If the trees are set 25 by 25 feet, about 67 trees per acre may be put on an acre.

The outside rows should be far enough away from roads, fences and other obstructions that, when the trees have attained their full size, there will be ample room for spraying and cultivation. Sufficient space should be left between the orchard planting and surrounding trees and hedges to prevent root interferences and shade as roots of nearby trees will rob them of moisture and plant food while shade will afford favorable conditions for fungus diseases.

Woods or thickets on the lower side of the orchard should be cleared as they prevent satisfactory air drainage.

If the orchard is set by the square system, the first step for insuring perfect alignment is the establishment of a base line. Assume that this line will be on the west side of the orchard running north and south from A to L (See diagram page 20). The position of each tree on this line should be accurately measured, aligned and marked. The position of each tree in the row A′ to L′ on the east side of the orchard should be established in like manner. A straight line or furrow can then be run across the field from A to A′, B to B′, etc. This will establish the rows running east and west. The exact position of the trees can be established on two of these east and west rows by exact measurement and they will serve to align all other trees without further measurement.

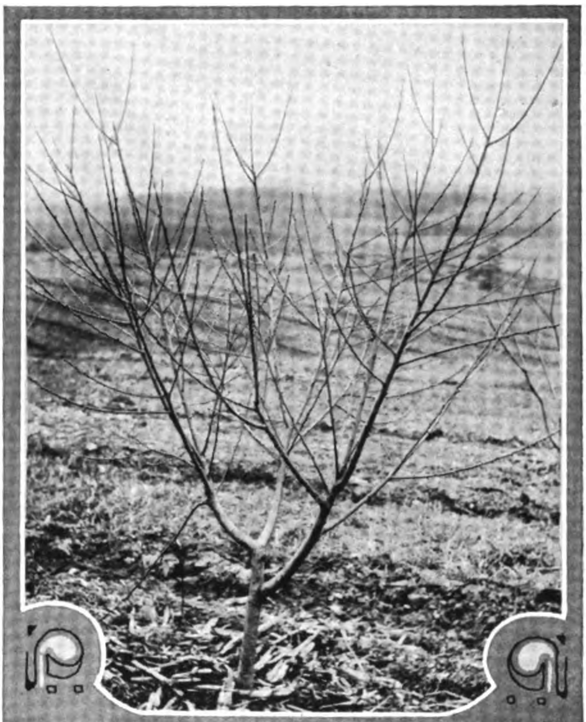
Method and Time of Setting Peach Trees:

In the northern sections where the winters are severe, spring setting of peach trees is universally recommended. In southern sections fall planting may be practiced. In the central sections spring planting is usually recommended, but fall planting is often practiced successfully. A dry, open winter is quite hard on fall set trees, but if the elements are kind the fall

set trees make an excellent growth in the spring. If spring setting is decided upon it should be done as early as possible after the severe winter weather is over.

Care should be taken to set the trees in straight rows because they not only look better but are less liable to be damaged when cultivating.

If the trees have been heeled-in or just received from the nursery, they should be removed in small quantities that can be planted readily, the injured or broken roots pruned off with a sharp knife and puddled in mud to throughtly coat the roots and prevent them from drying out.



A NEGLECTED PEACH TREE

A two year old peach tree badly in need of pruning. The view on the following page shows this tree correctly pruned.

The tree should be set as soon as possible in a hole which is large enough to accommodate the entire root system when spread out in its natural shape. The tree should be set about an inch or two deeper than it was in the nursery row. The top soil should be removed separately when digging the hole This should be put around the roots and packed firmly about them and the hole then filled about two-thirds full of soil and tramped well.

If the soil is not rich about two pounds of V-C complete fertilizer may be mixed with the balance of the dirt before it is put in the hole. This will insure the young tree available plant food for a strong, vigorous, growth. The top soil should be left loose to act as a mulch and conserve moisture.

The pruning should be done in the late winter or early spring and for the first year consists of cutting the young tree back to a whip about 24 to 30 inches high. If the side branches are spindling and weak, they should be

PROPERLY CUT BACK
The tree shown on the preceding page after proper pruning.

cut off, but if three or four of these young shoots are strong and well placed around the tree they may be left and cut back to four or five buds. If these little branches come out at different heights on the main stem they will develop a stronger tree than if all come out at the same distance from the ground.

If the tree is pruned to a whip without side branches it is allowed to grow the first season before these lateral or scaffold limbs are selected and then three or four strong, well placed laterals are selected early the next

season and cut back to a few buds as has been described. The pruning of the second season consists of cutting back the new growth resulting from these lateral branches about a third or a half of their annual growth and removing all interfering or cross branches which may have developed. If the orchardist intends to develop the popular vase-form or open headed tree he prevents any central leader branch from developing but if the central leader type is preferred this leader is cut back to the height of the remaining branches.

Open forks should be avoided when developing the tree. If four to six strong scaffold limbs, well spaced around the tree and up and down the trunk, are selected a good start is made toward forming a well-balaced tree. The spring pruning the following years is intended to produce a low, strong, well shaped tree with the fruiting wood evenly distributed throughout. Regular pruning will be necessary to keep the center open and the

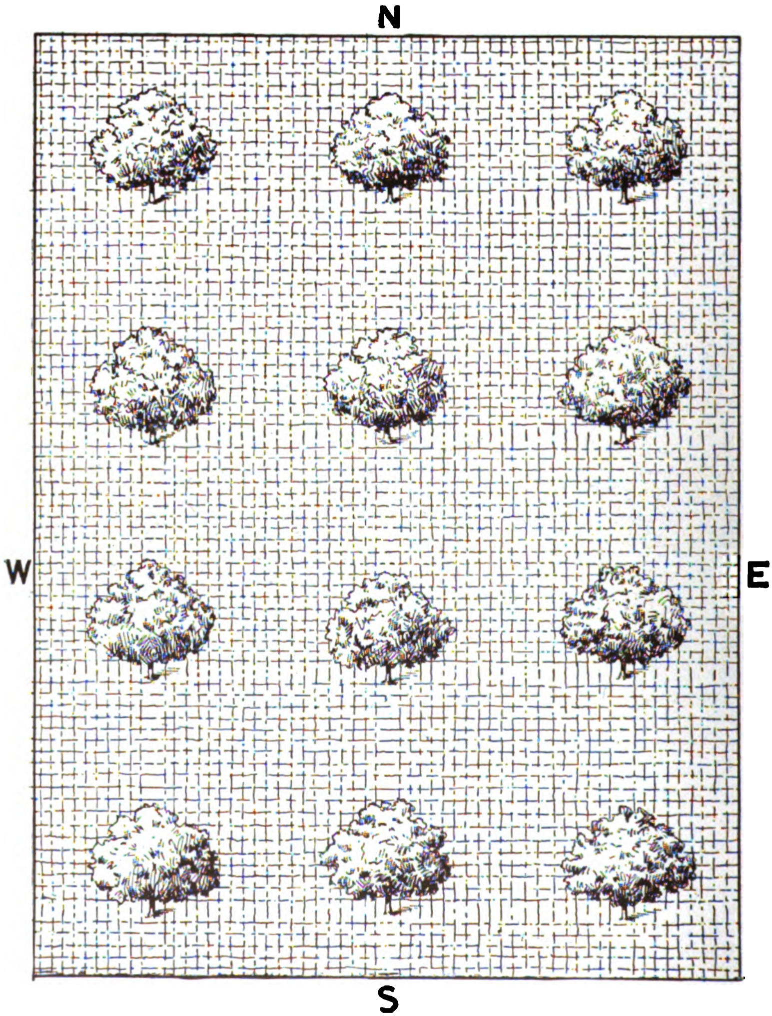
HARROWING A YOUNG ORCHARD

It is best to cultivate an orchard both ways and to get as close to the trees as possible without damaging the trunk.

amount of clipping-back practiced on the annual growth will depend upon the nature of the tree's growth. Slow growing trees may be pruned more severely than fast growing ones because spring pruning tends to stimulate wood growth and if a tree that grows very rapidly is pruned severely the growth will continue late in the season and go into the winter in a sappy condition.

The peach tree bears its fruit only on the new wood of the previous season's growth and annual pruning is necessary to keep a large amount of this wood well distributed throughout the tree. This is accomplished by thinning out and cutting back.

When the tree reaches the maximum height that you wish it to attain, it should be cut back to that point each year. This will cause the tree to become too bushy unless some of the older wood is cut out from year to year.



PROPER ORCHARD CULTIVATION

The cultivating implement is operated North and South and then East and West, crossing each other at right angles and coming in close to the trees. This manner of cultivation reaches all part of the orchard.

Plenty of sunlight in the tree is essential to good color and uniform ripening, but this should not be construed to mean that all of the inside branches are to be removed. It is only desirable to remove the unnecessary ones which cause the inside to become thick and heavily shaded. Cutting just above outside buds or branches will cause the tree to spread.

MANAGEMENT OF THE SOIL.

Peach trees grow very rapidly and make heavy demands upon the soil for moisture and plantfood. The steady growth of the tree must be assured by good soil management, because a stunted tree is slow in recovering even though remedial measures are applied.

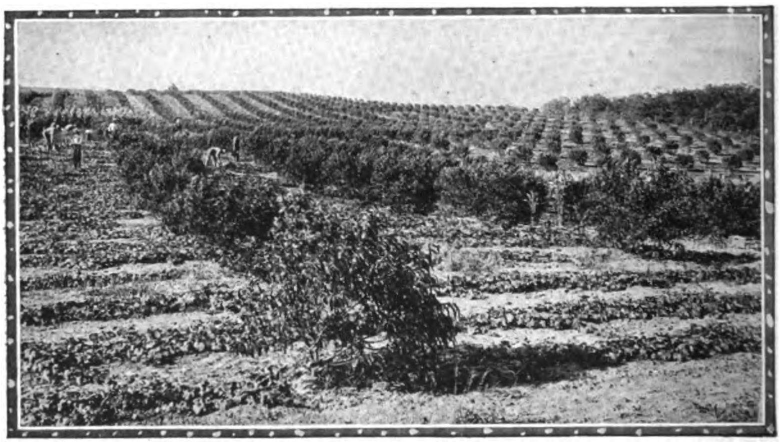
EFFECTIVE SOIL MULCH

Note how the cultivation extends under the trees and how the soil is hilled up next to the trunk. A mulch such as this conserves the soil moisture, an important factor in orchard management.

Cultivation:

Practically every successful commercial peach grower is convinced that thorough cultivation is an essential feature of profitable peach culture. The practical objects of clean cultivation are to conserve soil moisture and to improve the physical condition of the soil. This is accomplished by keeping the soil well cultivated during the growing season and then sowing a cover-crop about the first of August which is turned under in the spring, thereby adding organic matter to the soil and increasing its water holding capacity.

Cultivation should begin the first year the trees are set and be continued throughout their entire life. The land should be plowed about four inches deep in the spring and then disced and harrowed immediately after wards. The harrowing should continue with a spike tooth or spring tooth harrow about every ten days or after every rain. The plowing should be done with the contour of the land to prevent washing if the land is rolling. If the land is plowed toward the tree one season, it should be plowed out the following year to prevent ridges from being formed. For the first two or three years clean cultivation may be confined to narrow strip six feet wide on each side of the tree and the other space may be used for cultivated intercrops. After the third or fourth season the entire land should be devoted entirely to the trees.



INTERCROPPING

With heavy application of V-C Fertilizers and clean cultivation, the intercrop will pay for the new orchard.

Before the trees come into bearing it is customary to do the plowing as early in the spring as the condition of the soil will permit. After the trees come into heavy bearing, many successful orchardists believe that the plowing should not be done until the fruit is set. On many types of light, sandy, loam soil where the cover-crop can be turned under easily, it is customary to use the double discs instead of the plow.

The practice should be to cultivate frequently but not deeply. The weeds must be kept down, and a soil mulch maintained as thoroughly as is found in a well tended corn field. If a crust forms it is usually best to use a disc to break it up. There are several forms of extension discs on the market which enable the grower to work the soil under the trees. Tillage should continue until the latter part of July when preparation is made for sowing a cover crop. At this time the wood growth has been completed and the cover crop will aid the wood to mature thoroughly by taking part of the soil moisture.

Cover Crops:

Constant cultivation burns the organic matter out of the soil and this must be replaced by turning under cover crops in the spring. The organic matter improves the physical condition of the soil, making it more friable and increases its water holding capacity. Cover crops also protect the root systems of the trees from severe cold. Many cases are on record which show that cover crops have prevented winter-killing of the trees.

Rye is used extensively as a cover crop because it is a winter-surviving crop, is adapted to a very wide variety of soils and can usually be depended upon to make a good growth. In the southern half of the country crimson clover is used extensively and serves the purpose well. Hairy or sand vetch is also used on the lighter soils. Millet is used successfully by many growers but it does not live through the winter and this may be regarded as a disadvantage on some soils. The cover crop should be planted during the latter part of July or the first of August so it may have a sufficient time to make a good growth. Soils that are deficient in plant-food should receive a liberal application of V-C complete fertilizer to stimulate the rapid growth of the cover crop. This plant food will be returned to the soil for the use of the trees when the cover crop is turned under. The fertilizer will also make a cover-crop grow ranker and add more organic matter to the soil, all of which is very desirable and profitable.

Intercrops:

It is often possible to defray the expenses of the orchard for the first three or four years by growing cultivated crops between the rows, excepting a narrow strip on each side of the trees which is left for cultivation. On the sandy loams, melons, early potatoes, tomatoes, cabbage and root crops are used extensively. Market conditions will influence the choice of the intercrops grown. These crops make it possible and profitable to use liberal applications of fertilizer for them and the cover-crop and the trees will benefit from the residual effect of such applications. On the heavier types of loam soils navy beans have been used to advantage in numerous instances.

Grain or hay crops should not be used, excepting the possibility of soybeans, which may be cut early for hay in time to sow a winter cover-crop.

Under all circumstances intercropping should cease when the orchard comes into bearing because the trees should not have to compete with any other crops for plant food.

FERTILIZATION OF THE PEACH ORCHARD.

The peach tree makes a rapid growth and matures its crop in a short time and, therefore, demands a readily available supply of moisture and plant food sufficient to meet the needs of the orchard. There has been a great deal written on this phase of the subject that tends to confuse the average grower who has not given the subject exhaustive study. There are two forms of fertilization practiced, used alone and in combination, namely, the use of stable manure and commercial fertilizer.

Stable Manure:

The great majority of commercial peach orchards would be greatly improved by the use of ten tons of stable manure per acre. This material worked into the soil supplies available plantfood and organic matter to the soil, but two facts must be reckoned with; the supply of good manure is quite limited and it supplies a very small amount of phosphate in proportion to the percentage of other elements contained. Therefore, if sufficient stable manure is available it should be supplemented with 400 to 600 pounds of acid phosphate per acre. Soils that are already well supplied with humus and plant food do not need the application of manure, except in small quantities occasionally.

Commercial Plant Food:

Commercial fertilizers are depended upon in most commercial orchards because of the difficulty of obtaining enough manure to apply 8 to 10 tons per acre.

When considering the use of fertilizer the question that naturally arises in the reader's mind is, What formula should be used? The wide variety of soils on which we find peach orchards growing makes it impossible to answer this question because a formula that gives good profits on one type of soil may be a disappointment in another orchard.

Unless peach trees are well fed they cannot make a good growth, produce fruit wood and mature the crop. Trees which are under-nourished will be low in vitality and more subject to winter injury. It is evident, therefore, that unless the soil is well supplied with organic matter and plant food the use of proper fertilizing material is essential for best results.

The behavior of the tree must guide the grower in the selection of his fertilizer and to properly interpret this behavior it is necessary to know, in a general way, the effect of the separate elements upon growth and fruit production.

Nitrogen:

This element is most important in stimulating the growth of wood. Trees that do not show a strong annual growth or which appear to be stunted and low in vitality are in need of nitrogen. The pale color of the leaves and short growth of branches indicate the serious lack of this element and it should be applied in the spring just after plowing and worked into the soil. The work of several Experiment Stations in this country show that more nitrogen may be used in the fertilizer than was heretofore considered safe.

Trees that are making a rank annual growth should not receive much nitrogen in the fertilizer because of the tendency to prolong wood growth and the resulting danger of winter injury.

Phosphorus:

This important element in practically all available forms of fertilizers occupies a vital place in the production of fruit buds, fruit, and in maturing the wood. It is used to balance the plant food in stable manure which is strikingly deficient in this element. Trees that are starved and low in vitality should receive a liberal portion of phosphorus. Fortunately it does not have the tendency to leach that nitrogen does.

Potash:

Potash enters into the formation of fruit buds with the other elements and is needed to mature the new growth. The fact that considerable potash is found in wood ashes indicates the need of this element. It is also given credit for influencing the ripening and coloring of the fruit.

The most satisfactory way to determine the fertilizer needs of your peach orchard is to select a plot that is uniform in every way and then divide the plot into equal divisions of several trees each. Apply complete fertilizer to one division, acid phosphate to one, phosphate and potash to one. phosphate and nitrate to one, potash and nitrate to one, potash to one and nitrate to one. An accurate record should be kept of the results and this should be repeated for several years. On the balance of the orchard use an application of 400 to 800 pounds of V-C Complete Fertilizer analyzing three to four per-cent available nitrogen, eight to ten per cent. available phosphorus and five to eight per cent. of potash. If the trees are young they should receive from three to five pounds apiece. If the wood growth is rank, buy a formula without nitrogen. It is advisable to apply the fertilizer in the spring just after plowing and then work it into the soil.

Applications of nitrate of soda are used to revive poorly nourished trees when reclaiming a neglected orchard.

Soils that are very acid should be limed, using from two to four tons of ground limestone per acre to correct the acidity. It is preferable that this be done on a leguminous crop preceding the setting of the orchard.

It should be borne in mind that fertilizer will not give the best results unless the soil has plenty of organic matter in it, therefore, good management demands that the cover crop be turned under each year and the results of this combined treatment will result in increased yields, better quality, and larger sized fruit, all of which affect the selling price of the crop.

RENOVATION OF PEACH TREES.

Sometimes the severe winter weather injures the greater part of the tree or a man may come into possession of a neglected orchard that is worthy of renovating. The method of bringing such trees back into profitable bearing will depend upon the general condition of the orchard, but it is possible to recommend the following general measures.

Prune the tree back into the three or four year old wood during late winter or early spring. Occasionally it may be necessary to dehorn the tree, but this is not desirable unless absolutely necessary. If the land has not been well managed it should be plowed shallow, disced and harrowed as early in the spring as possible, and this cultivation should be continued until time to sow the cover crop. After plowing apply 400 to 500 pounds of V-C Complete Fertilizer, analyzing 2 to 4 per cent. nitrogen, 8 to 10 per cent. phosphate and 2 to 6 per cent. of available potash.

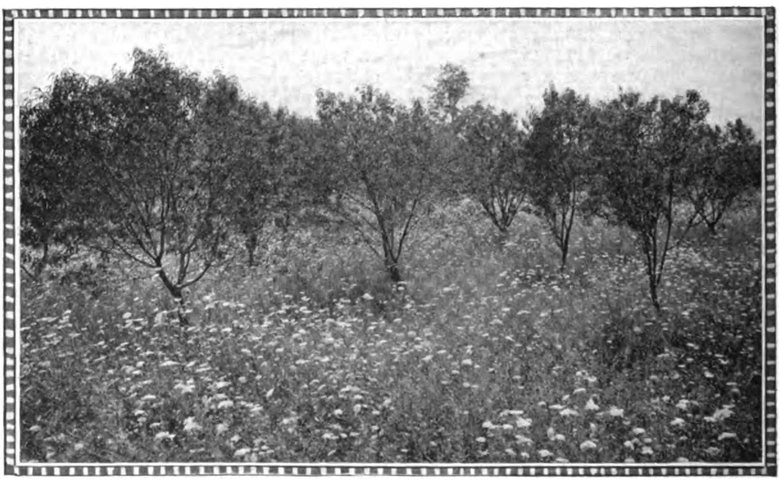
The trees will require careful pruning the following years to prevent a thick mass of small limbs from forming where the old wood was cut out. The principles of pruning already described should be followed to develop a low, compact tree. Trees that need to be cut back severely, because of neglect, may be pruned during the spring of the year when a crop failure is apparent. This work may be done after the trees have had time to bloom.

Thinning

Where trees have a tendency to set an over abundance of fruit which cannot possibly mature, it is often necessary to resort to thinning if peaches of full size, shape, high color and superior quality are to be produced. Thinning prevents the breaking of branches and encourages the setting of a full supply of fruit buds for the ensuing year. While no fixed rule can be followed, the plan of leaving four inches between fruit is a safe rule. Thinning should be done before the pits harden when the peaches are from one-third to one-half inch in diameter.

The approximate number of peaches which may be left on healthy normal trees is as follows:

3 year old tree	125 to 175
4 year old tree	225 to 275
5 year old tree	350 to 450
6 year old tree	500 to 600
Maximum	600 to 700



A NEGLECTED ORCHARD
The removal of weeds by proper cultivation, pruning and the liberal application of V-C Fertilizers will convert such a liability into a large income producer.

DISEASE AND INSECT CONTROL.

The peach must be sprayed in most communities to protect it from insects and diseases that ruin it for commercial purposes.

There are some sections where peach growing is a new industry that do not need anything but the winter or dormant spray to control the scale insects and the leaf curl.

Winter or Dormant Spray:

For this spray it is customary to use the regular concentrated lime-sulphur solution diluted to 5 degrees Baume, which is equivalent to one gallon of commerical concentrated lime-sulphur to eight gallons of water. This material applied in late winter or early spring before the buds begin to open will control the San Jose scale and the peach leaf curl. Miscible oil sprays will control the scale but do not give such good results in preventing the curl. This spray should be applied very thoroughly.

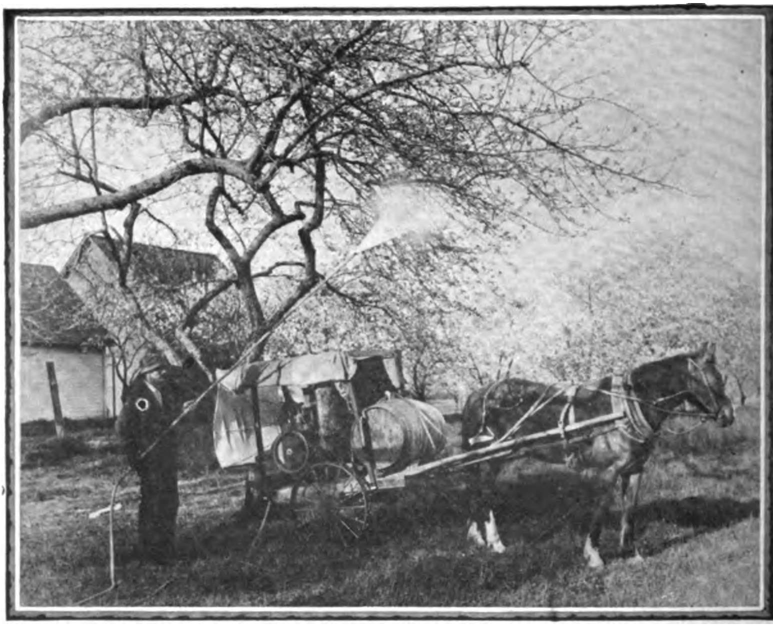
RUINING THE ORCHARD

Ignoring the cost of propping, allowing overloading of peach trees, weakens the trees; lowers the quality of the fruit; makes the trees more susceptible to attack by insects and disease, and is usually followed by a very poor crop. If pruning does not bring about sufficient reduction in the quantity of fruit, the peaches should be thinned so that the individual fruit on one twig or limb are not nearer than 4 to 6 inches.

Summer Spraying:

The Curculio is the insect responsible for the "worms" in Peaches. The adult insect lays the egg in a puncture made in the young Peach. The egg hatches, the grub eats its way into the Peach and this damage is responsible for both the falling of the Peaches before they mature and for the "wormy" Peaches which comes from unsprayed orchards. The curculio is known in different localities under several names, such as "peach worm," "peach curculio," "plum curculio," "plum weevil," "little Turk."

The Brown Rot and the Scab are two fungus diseases which are parasitic upon the Peach. Infection is caused by the spores being blown by the wind or carried by insects. Brown Rot forms small circular brown spots on the fruit and in warm moist weather these enlarge rapidly and invade the entire Peach. If the Peaches do not drop they may dry on the tree and remain through the winter. Scab dwarfs the fruit, ruptures the skin and is responsible for premature dropping. The fruit that remains on the tree becomes cracked, scabby and often entirely unfit for market. East of the Rocky Mountains the Peach crop is estimated to be damaged annually one tenth by the scab. The curculio and the brown rot each are more destructive than the scab.

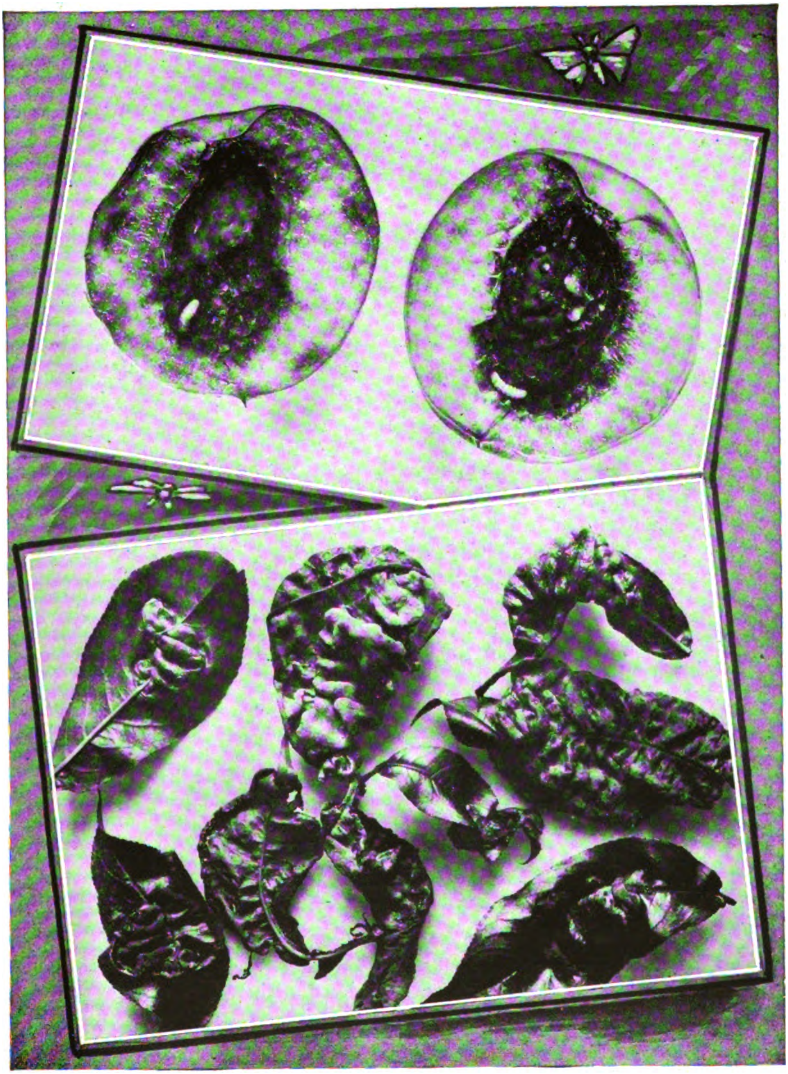


A HOME MADE SPRAYER

Many seasons of labor and care can be ruined in one season by insects. Proper spraying insures healthy trees and, when coupled with the use of V-C Fertilizers, results in greater yields and better fruit.

Fortunately for the Peach growers these three Peach enemies may be fought by the same spray, and since all three of them are almost universally found in Peach orchards, the one safe plan to pursue is to apply the combined spray as if it were known that all three enemies were abundantly present.

The first summer spray is applied when the shucks are shedding from the newly set fruit. One pound of powdered arsenate of lead or two pounds of paste arsenate of lead are used to 50 gallons of water. Two pounds of hy-



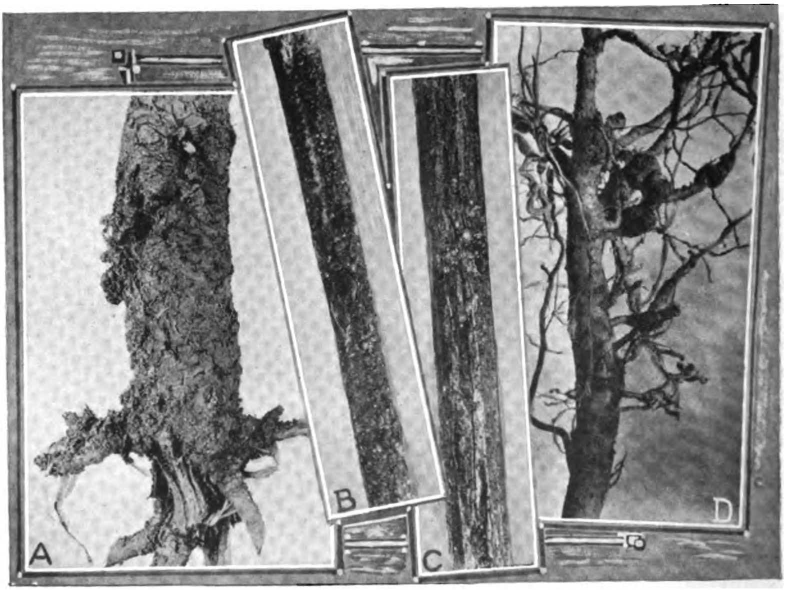
TOP—Curculio Larval on Ripe Fruit.
BOTTOM—Peach Leaf Curl.

drated lime should be added to every 50 gallons to prevent burning of the foliage. This spray is applied to prevent curculio injury and if the insect is not prevalent in the community it may be omitted.

The second summer spray is generally applied about two weeks later and self-boiled lime-sulphur, or a satisfactory substitute, is used. This is to control the scab.

The third summer spray is applied about a month before the fruit ripens and the same material is used as for the second spray.

The Experiment Station will advise regarding the protection of the fruit from insects and disease and their recommendations should be solicited.



INSECT PESTS

A—Peach Tree Borer and His Work.
B. & C—San Jose Scale on Twigs.
D—Nematode Galls on Roots of Peach.

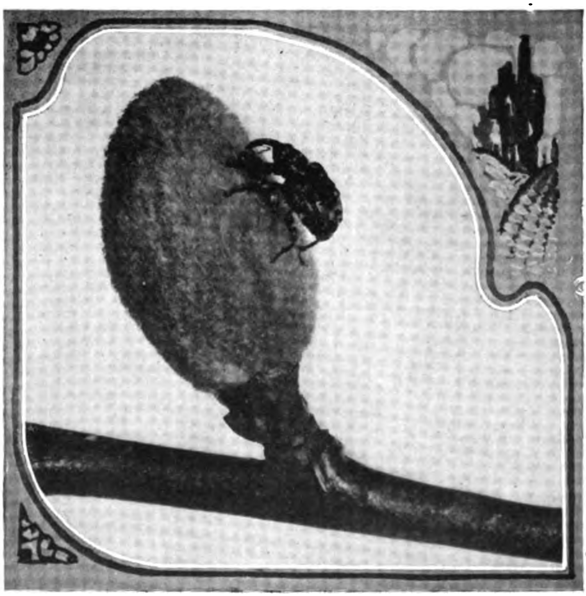
Destroying the Peach-tree Borer.

Peach borers are troublesome and destructive. The insects may be dug out from under the bark with a knife or a soft piece of wire and this is usually done in August or September.

The gassing of the peach-tree borer with para-dichlorobenzene is proving satisfactory where used by government and state experiment stations and commerical orchardists. This chemical may be obtained through any druggist, who should grind it until it is about like coarse salt. It is spread

in a ring about the base of each bearing peach tree,, not in contact with the trunk, at the rate of one ounce to a tree, after first breaking the crusted soil with a hoe. When the crystals have been applied, cover evenly with a couple of inches of soil and pack slightly.

Para-dichlorobenzene is not soluble in water, hence does not wash out. At summer temperatures, it becomes a gas, which, being five times heavier than air, percolates through the soil, poisoning the insects which must inhale it. Because of its weight, this chemical should be applied only deep enough to prevent surface loss of the gas. (U. S. D. A. Bul. 796.)



CURCULIO BEETLE ON YOUNG PEACH (Enlarged)

Nematodes:

The Nematode Worm deserves the especial attention of those contemplating peach growing on the light sandy soils of the Southern States. The injury caused by nematodes is usually known as "root-gall" or "root-knot" See that stock purchased is free and that land used for new orchards is not infected. If the orchard becomes infected, frequent, clean cultivation and the free use of commercial fertilizers will stimulate the trees into so vigorous a growth that good fruit and well grown trees may be had in spite of the nematodes.

A SPRAY SCHEDULE FOR PEACHES—Prepared by Prof. Newman.

When to Spray.	What to Spray For.	The Spray To Use.	Notes.
1. When trees are dormant (in winter).	San Jose Scale, peach-leaf curl and brown rot.	Winter strength: Lime-sulphur (a) 1 part to 9 parts of water. Use liberally and wet all the tree.	It is safe and profitable to use this spray every winter, even though no scales are apparent.
2. When some of the blossom shucks have fallen from the young peaches.	Curculio, brown rot and scab.	(b) Two pounds of arsenate of lead paste (or 1 lb. of dry) to 50 gals. of water and (a) self-boiled lime-sulphur.	This spraying, if well done at the right time, will reduce most profitably loss from curculio.
3. 15 to 25 days after 2nd spray.	Curculio, brown rot and scab.	Same as above.	Effective for rot and scab and may be omitted where these diseases are not troublesome.
4. 15 to 25 days after 3rd spray.	Curculio, brown rot and scab.	Same as above. Arsenate may be omitted if no curculio are present.	This may be omitted for early varieties and where brown rot and scab are not troublesome.
5. 25 to 35 days before ripe and not earlier than three weeks after No. 4.	Brown rot and scab.	(a) Self-boiled lime-sulphur.	This spraying for late peaches only.

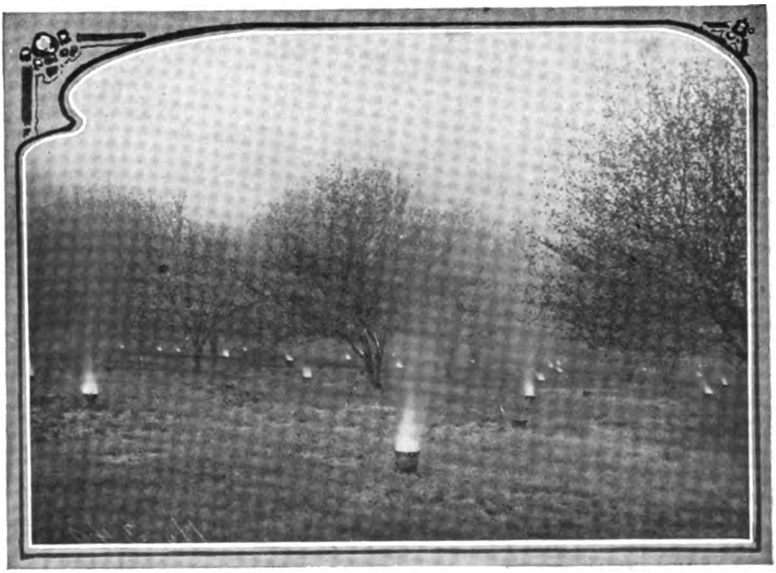
(a) To make self-boiled lime-sulphur use 8 lbs. fresh lime, 8 lbs. flour of sulphur and 50 gals. water. While lime is slaking add and thoroughly stir in sulphur. Use just enough water to prevent burning and allow to boil from heat of lime for 15 minutes. Dilute and use.

(b) Dissolve 2 lbs. of arsenate of lead paste or 1 lb. of powdered arsenate of lead made into a thin solution and add to the lime sulphur spray, mixing well.

HARVESTING AND MARKETING.

After a grower has produced a good crop, it is necessary that it be properly picked and marketed unless he chooses to sell it to a fruit buyer on the tree.

Considerable experience is required to know just when to pick a peach for market. If the crop must be shipped it is picked a little green, but for a local market it is allowed to mature on the tree. Yellow-fleshed fruit is picked when yellowish green and white-fleshed peaches are picked as the green seems to be fading.

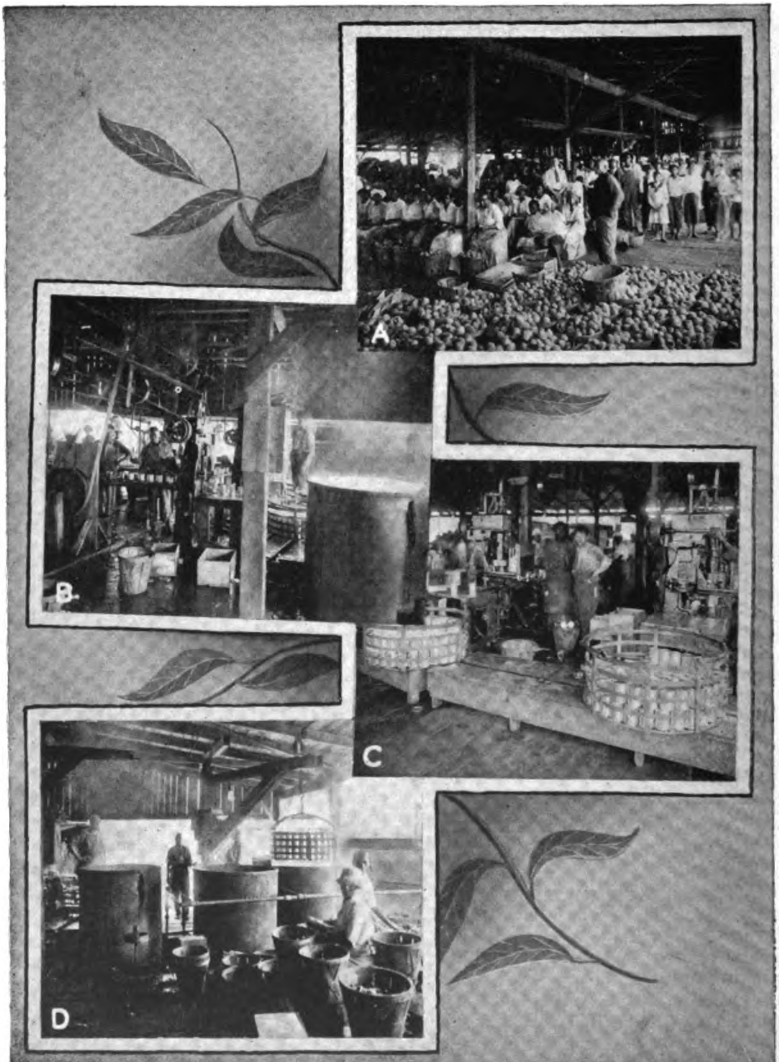


ORCHARD BURNERS

The cost and maintenance of orchard burners is a minor consideration when one realizes the great value of the crop they save from frost.

The picking is usually done in half bushel baskets. It must be handled very carefully because bruised fruit will not ship or keep. Picking is done by grasping the peach, tipping it sideways with a slight twist, which should release it from the spur. It is necessary to go over the trees several times, picking only those that are ready each time. It is usually possible to clean up an Elberta tree in two or three pickings, while a Champion tree will require five or six pickings.

The fruit is taken to the packing house on wagons fitted with bolster springs and is there graded and packed according to the demands of the market to be supplied. The fruit harvested each day should be on its way to market by night unless it is to be sold locally. In such cases it should be sold the following day.



INTERIOR VIEWS OF PEACH CANNFRY

A—Peaches as they come from the orchard.
B—Capping machines and cooking vats.
C—Cans in containers ready for sterilizing.
D—Containers being lowered into steam cooking vat.

For the small grower advantage may be taken of special trade at grocery stores. Large shippers will ship in carload lots to commission men.

It is important that the grower put up an honest pack and he will be paid well in the long run for making special effort to see that his fruit reaches the market in the best condition. Broken baskets, mashed fruit, or overripe fruit will affect the selling price. Very often much of the trouble that develops between the commission dealer and the grower is the fault of the latter.

For small growers the selling associations have proved quite successful when the growers work in harmony. They should agree on a uniform pack and package; pick the fruit in the same condition; grade it uniformly and agree to stand by inspection. Under such conditions they can ship in carload lots and realize the greatest profit from their crops.

Utilization of Cull and Surplus Peaches.

A portion of all crops of peaches is unfit for market as fresh fruit and merchantable fruit is left on the growers hands at times. Every peach grower or community of peach growers should be prepared to take care of such fruit by canning, preserving, drying or by the manufacture of syrups or jellies. The cost of such equipment is relatively low, it will last for several years and it can be used for other fruits and vegetables as well. Detailed instructions for "Canning Peaches on the Farm" are found in Farmers Bulletin No. 426 of the U. S. Dept. of Agriculture, Washington, D. C.

VARIETIES RECOMMENDED BY STATE AND GOVERNMENT AUTHORITIES.

ALABAMA. **Commercial varieties:** Mayflower, Greensboro, Carman, Hiley, Belle, Elberta. **Home orchard and local market** in addition to the above add Arp, Rivers, Slappy, Mamie Ross and Mountain Rose.

ARKANSAS. Varieties recommended **for northern parts** of state are Alexander, Sneed, Greensboro, Triumph, Champion, Family Favorite, Belle, Chinese Cling, Elberta, Heath; **for southern part of state,** Elberta, Indiana Cling, Perkins, Salway, Stinson.

CONNECTICUT. **Commercial varieties:** Carman, Greensboro, Belle, Elberta. **Home orchard and local market:** Carman, Hiley, Champion, Elberta.

DELAWARE. **Commercial varieties:** Carman, Belle, Elberta. **Home orchard and local market:** Greensboro, Slappy, Lola, Carman, Belle, Elberta, Francis, Krummel's.

ILLINOIS. **Commercial varieties:** Elberta, Captain Ede, Belle, Champion and J. H. Hale. **Home orchard and local market:** (Northern Illinois) Alexander, Champion, Elberta; (Central Illinois) Champion, Elberta, Crawford Early, Heath Cling, Carman, Greensboro, Foster, Alton.

INDIANA. General Recommendations for **Southeast:** Champion, Mountain Rose, Early Crawford, Old Mixon Free, Elberta, Smock, Heath. For **central sections:** Alexander, Greensboro, Carman, Triumph, Champion, Early Crawford, Foster, Belle, Old Mixon Free, Elberta, Late Crawford, Stump, Hannah, Lemon Cling, Wonderful, Heath.

FLORIDA. **Commercial varieties:** Jewel. **Home orchard and local market:** Florida Gem, Imperial, Angel, Waldo, Faber.

GEORGIA. **General Recommendations: Central part of state:** Mayflower, Greensboro, Carman, Waddell, Hiley, Belle, Elberta. **East central part of state:** Carman, Hiley, Thurber, Belle, Elberta. **Northeast part of state:** Belle, Elberta, Fox, Heath.

KENTUCKY. **Commercial varieties:** Carman, Belle, Smock, Salway, White Heath, Globe, Crawford, Elberta. **Home orchard and local market:** All of above and in addition, Mountain Rose, Chairs Choice, Old Mixon, Greensboro, Champion.

LOUISIANA. **Home orchard and local market:** Mayflower, Sneed, Triumph, Arp, Elberta, Champion, Chinese Cling, Blood Cling, Wonderful.

MARYLAND. **Commercial varieties:** Greensboro, Champion, Belle, Elberta, Carman, Ray, Mamie Ross, Hiley, Crawford Late, J. H. Hale, Francis, Slappy, Salway and Bilyeu. **Home orchard and local market:** Same as above and Kalamazoo, Burs Chairs, St. John and Stump.

MICHIGAN. **Generally recommended for southwest:** Dewey, Lewis, St. John, Champion Engle, Belle, Elberta, Gold Drop, Lemon Free, Smock, Salway, Ailesworth. For **South Central:** Lewis, Engle, Kalamazoo, Elberta, Chili and Gold Drop. For **Lower Peninsula:** Alexander, Rivers, Triumph, Dewey, Fitzgerald, Early Crawford, Crosby, New Prolific, Elberta, Chili.

MISSISSIPPI. **General Recommendations:** Heath Cling, Old Mixon Cling, Parham, Amelia, Family Favorite, Foster, Mamie Ross, Mountain Rose, Old Mixon Free, Elberta, Stump, Tillotson, Blood Cling.

MISSOURI. **Commercial varieties: Howell** and **Oregon** Counties, Elberta; **Newtcn** and **Lawrence** Counties, Elberta, Krummell and Heath. Around cities add Mountain Rose, Family Favorite, Belle and Henrietta. **Home orchard and local market:** Alton, Champion (for northern part of state only), Carman, Family Favorite, Elberta, Belle, Hale, Salway, Krummell, Henrietta and Heath.

NEW JERSEY. **Commercial varieties:** Carman, Lola, Hiley, Belle, Elberta, Francis are the leaders, but Greensboro, Iron Mountain and Krummell are grown to a limited extent.

NEW HAMPSHIRE. **Commercial varieties:** Greensboro, Carman, Champion, Elberta and Fitzgerald. **Home orchard and local market:** Same as above and Mountain Rose, Foster and Hiley.

NORTH CAROLINA. **Commercial varieties:** Mayflower, Greensboro, Arp, Carman, Belle and Elberta. **Home orchard and local market:** Alexander, Triumph, Mamie Ross, Connett, Hiley and Chinese Cling in addition to above.

OHIO. **Commercial varieties:** Elberta, Champion, Lemon Free, Salway and Smock. **Home orchard and local market:** Greensboro, Carman, Crosby, Bell, Champion, Elberta, Smock.

OKLAHOMA. **Commercial and home varieties:** Triumph, Carman, Family Favorite, Elberta, Champion, Late Crawford, Heath Cling, Salway.

PENNSYLVANIA. **Commercial varieties:** Carman, Hiley, Champion, Belle, Elberta, J. H. Hale and Fox. **Home orchard and local market:** Those above and also Mayflower, Edgermont and Rochester.

RHODE ISLAND. **Commercial varieties:** Carman, Elberta. **Home orchard and Local market:** Carman, Elberta, Mountain Rose and Champion.

SOUTH CAROLINA. **For entire state:** Mayflower, Greensboro, Carman, Mamie Ross, Belle, Elberta, Crothers, Oldmixon Free and Stinson.

TENNESSEE. **Southeast:** Carman, Belle, Early Crawford, Reeves, Elberta, Late Crawford, Mathews, Smock, Bilyeu. **Central:** Carman, Champion, Belle, Elberta, Crothers. **East Central:** Sneed, Greensboro, Carman, Belle, Elberta, Thurber. **Northeast:** Alexander, St. John, Mountain Rose, Belle, Elberta.

TEXAS. **Commercial varieties:** Sneed, Arp, Carman, Elberta, Stinson, Heath Cling, St. John and Stump. **In Northwestern part of state:** Alexander, Mamie Ross, Angel, Hale, Salway, St. John and Cabler.

VERMONT. **Commercial and home orchard:** Elberta, Kalamazoo, Champion, Early Crawford, Late Crawford, Foster Rivers, Chili, Crosby, Smock, Stevens, St. John and Stump.

VIRGINIA. **Commercial varieties:** Carman, Hiley, Belle, Elberta, Smock and Comet. **Home orchard and local market:** In addition to the above, Early Crawford, Champion, Old Mixon Free, Stump, Heath Cling and Salway.

WEST VIRGINIA. **Commercial varieties:** Carman, Champion, Belle, Hiley, Reeves, Elberta, Salway, Late Crawford. **Home orchard and local market:** Same as above with addition of Triumph, Beer's Smock and Bilyeu.

Free V-C Crop Books

THE Agricultural Service Bureau of the Virginia-Carolina Chemical Company issues a series of crop books similar to this one, which every farmer or land owner will find full of practical suggestions and information on the growing of the leading farm crops.

Each book covers all the steps in the production of the crop, including Soil Management, Soil Preparation, Selection of Varieties, Planting or Setting, Fertilization, Culture, Pest Control, Harvesting and Marketing. The titles of the books and the crop they cover, are as follows:

1. **Cotton.**
2. ***Corn.**
   Field Corn　Sweet Corn
3. ***Tobacco.**
4. ***Wheat, Oats, Rye, Barley and Rice.**
5. ***Grasses for Hay and Pasture.**
   Grasses　Alfalfa
   Clovers　Cowpeas
   Millets　Soy Beans
6. ***Vegetables and Truck Crops.**
   Asparagus　Egg Plant　Pumpkins
   Beans　Garlic　Radishes
   Beets　Leek　Shallots
   Cabbage　Lettuce　Spinach
   Cantaloupes　Onions　Squash
   Cashaws　Peas　Tomatoes
   Cauliflower　Peppers　Watermelons
   Celery　Potatoes, Irish　Hot Beds
   Cucumbers　Potatoes, Sweet　Cold Frames
7. ***Strawberries and Other Berries.**
   Blackberries　Raspberries
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8. ***Orchards and Good Fruit.**
   Apples　Nectarines
   Apricots　Peaches
   Cherries　Pears
   Grapes　Plums
9. **Citrus Fruits and Truck Crops.**
   Grape Fruit　Oranges
   Lemons　Pineapples
   Subtropical Truck Crops
10. **Peanuts.**
11. **Sorghum and Sugar Cane.**

12. **The Boll Weevil and How to Fight It.**

13. **Making Soils and Crops Pay More.**

    A Practical Discussion of Soil and Fertilizer Problems.

14. **Apples.**

15. **Sugar Beets.**

16. **Peaches.**

*Indicates that two editions are available, one adapted to Southern conditions, the other to Northern and Western practice.

If you have any question in regard to the Management of the Soil, or the Growing of Crops, which the books do not answer, write the Bureau, stating your problem, and your letter will be given prompt attention. This service is free.

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Richmond, Virginia.

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☐ 10. **Peanuts**
☐ 11. **Sorghum and Sugar Cane**
☐ 12. **The Boll Weevil**
☐ 13. **Making Soils and Crop Pay More.**
☐ 14. **Apples**
☐ 15. **Sugar Beets**
☐ 16. **Peaches**

Name ____________________________________

Address ____________________________________

Fertilizers of High Grade Analyses Save Time, Material, Labor and Money

Low Analysis

High Analysis

THESE two piles of fertilizer—eight bags on the left, five bags on the right—contain exactly the same amounts of plantfood.

High analysis fertilizer saves three-eighths, or more of the *freight cost*—freight on five tons or less, instead of on eight tons.

High analysis fertilizer saves three-eighths, or more of the *hauling costs*—five trips to the warehouse instead of eight or more.

High analysis fertilizer saves three-eighths, or more of the bag costs—five bags instead of eight.

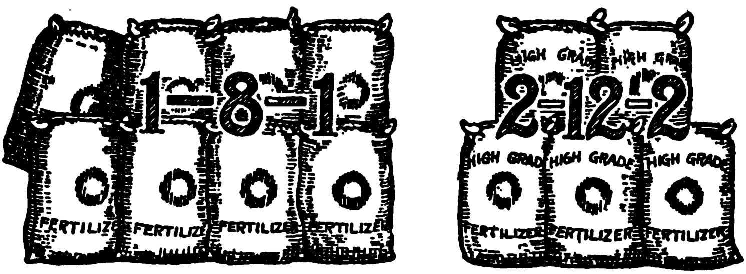
Finally, high analysis fertilizer saves at least three-eighths of storage costs.

Why not get the most for your money?

Save Money in Buying Fertilizer—Order Analysis Containing Fourteen percent. or over of Plantfood

Fertilizers of High Grade Analyses Save Time, Material, Labor and Money

Low Analysis **High Analysis**



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Why not get the most for your money?

Save Money in Buying Fertilizer—Order Analysis Containing Fourteen percent. or over of Plantfood

PEACHES

The North and West Appreciate Good Peaches

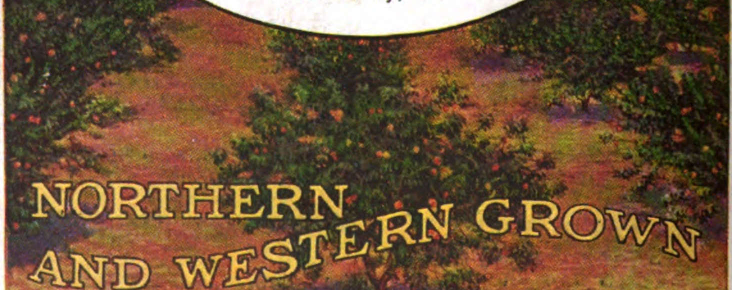
"For a number of years I have used V-C Fertilizers, and, without a doubt, I believe that you come nearer giving a dollar's worth for a dollar in Fertilizer value than any other concern. V-C Goods always check up right, and there is every evidence in the world to show that you are painstaking from the class of sacks on up to the contents.

As a Peach Tree Fertilizer, I know from experience that you can fill the bill, as the finest peaches I ever saw were made with V-C Fertilizers under them. I used V-C Fertilizers on my Big Indian Fruit Farm where I raise peaches "For a Trade Where Quality Counts."

V-C Fertilizers certainly helped me to put the beautiful color on my peaches, which fact is highly complimented by Produce Merchants, especially those in the North and Middle West, where I ship a great deal."

H. C. Neil

Big Indian Fruit Farm,
Fort Valley, Ga.



FOR SALE BY

PEANUTS

Published by

VIRGINIA-CAROLINA CHEMICAL CO.

RICHMOND, VIRGINIA

(*From Southern Ruralist, Atlanta, Ga.*)

A Great Product
Real Prosperity Maker

ONE of the greatest institutions of the United States is the company that manufactures V-C Fertilizers, which was established more than 20 years ago. It operates about 50 Fertilizer Factories throughout the Eastern half of the United States, with sales offices at centrally located points.

The Fertilizer Factories of this company are the most extensive and complete in the world, their equipment consisting of the most modern mechanical devices ever invented. These plants are all located at points where economical shipping conditions exist, both by rail and water, and occupy thousands of acres of ground, employing about 10,000 persons in the manufacture of complete High Grade Fertilizers.

The Company operates an extensive chemical labratory, equipped with the most complete and perfect apparatus obtainable. Here daily tests and analyses are made of all V-C Fertilizers before shipped, thereby assuring the absolute reliability and perfection of V-C Fertilizers at all times. No other Fertilizers are more accurately and carefully analyzed and mixed than V-C Fertilizers are.

Beginning with but five factories in 1895, it is at once apparent why the company manufacturing V-C Fertilizers, has assumed such vast and important proportions in the Fertilizer Industry. Many of its Brands have been on the market for 50 years. Quality and highest Grade have been the watchword of those responsible for the great consumption which V-C Fertilizers now enjoy.

A vast army of planters and farmers testify to the excellence of V-C Fertilizers, and it is a recognized fact to what extent the company is responsible for "Increased Yields per Acre."

Indeed the fields of the Great Eastern half of the United States have become famous through their prosperity, and the V-C Company has helped to make them so. Its aim is to make these vast fields still greater in their productiveness by hearty co-operation with the tillers of the soil.

* * * * * * * *

IMPORTANT: This book was written by a practical farmer who has made a life's study of how to get most out of Soils and Crops. To what extent V-C is a Crop Food and a Permanent Soil Builder is evidenced by the numerous testimonials received from thousands of successful farmers and planters who have applied V-C, a few of these will be found in this book.

WHY NOT V-C NOW?

Peanut Culture

Published by

CROP BOOK DEPARTMENT

VIRGINIA CAROLINA V-C Fertilizers CHEMICAL CORP. RICHMOND, VA.

ILLUSTRATIONS
FROM PHOTOGRAPHS OF V-C CROPS
AND
PHOTOS USED BY COURTESY OF
U. S. DEPARTMENT OF AGRICULTURE, THOMAS HUSTON,
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CONTENTS

King Peanut—truly an appropriate title for one of our domestic nuts that contributes to such a variety of uses. From acid to Alkoli, From Candy to Roofing Tar.

Stacked Peanuts on farm of John Bradshulls, Walters, Va. Mr. Bradshulls is a user of V-C and the number and size of his stacks indicate that V-C gave him an abundant harvest.

A Few Interesting Facts About Peanuts

What Happened in Texas:

The head of the largest establishment in the world manufacturing Peanut products addressed a few hundred skeptical farmers at a Texas courthouse about eight years ago. These farmers reluctantly listened to him while he told them about the great possibilities of the Peanut as a sure and safe crop for them to grow on their farms. He told them that it was no longer a question of whether there would be a market for the Peanut crop, but whether there would be enough Peanuts to supply the market demands.

As a result of this information these farmers became enthusiastic and agreed to plant ten thousand acres to Peanuts that year. However, when a representative of this same manufacturer visited this section about a month before harvest he was not able to locate any Peanuts. Upon inquiry among these farmers he found that their skepticism was greater than their enthusiasm. For they did not believe that there was a demand for any such vast quantities of Peanuts as they had been told; that in their opinion ten carloads would supply the Peanut requirements of the United States; that Peanuts were only used at fruit stands, circuses and baseball grounds.

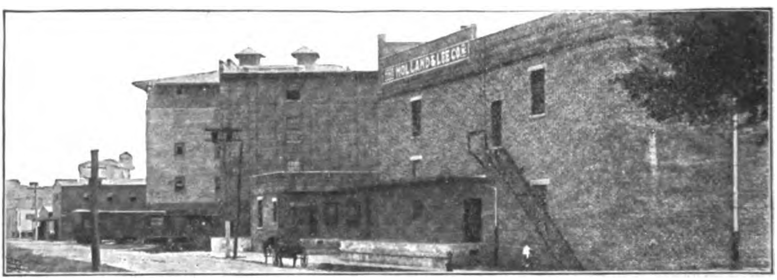
The above well illustrates the attitude of a great many farmers of the South even at this day. However, the Texas farmers finally did wake up to the possibilities of the Peanut. That year, eight years ago, there were only 64,000 acres grown to Peanuts in Texas, whereas in 1917 Texas had 600,000 acres grown to Peanuts, according to U. S. Department of Agriculture. Though Peanut acreage and production in the South has greatly increased within the last eight years, even today the demand is still greater than the supply, as the following statements from reliable sources prove.

A Fifty Million Dollar Prediction:

This manufacturer of Peanut products, who tried to interest the few hundred farmers of Texas eight years ago in the growing of Peanuts, made this remarkable statement as late as May 14, 1917:

"I am willing to prophesy that within ten years the Texas crop of Peanuts will amount to fifty millions of dollars or more a year. Last year Texas alone grew seven million dollars worth of Peanuts which were pressed for oil. Millions of pounds of Peanut butter are now used where thousands were used a few years ago. Peanut butter is not only used in private families, but confectioners are large users of Peanuts in the United States. The Peanut salters are probably the largest users of Peanuts in the United States. We want American Peanuts if we can get them, because they are better in quality, but we can not get enough of them."

The president of one of the largest oil mills in the South, as late as May 18, 1917, complained that they were not able to meet the increased demand for Peanut oil because of the present very limited supply of Peanuts.



Peanut factory row, Suffolk, Va. In these Peanut factories the Peanuts are cleaned, sorted, graded and prepared for the market. The better the quality of Peanuts the higher the market price.

Not Keeping Pace with Demand:

Mr. W. R. Beattie, formerly of the U. S. Bureau of Plant Industry, claims that Peanut vendors alone sell about six million dollars worth of Peanuts annually, and that our markets are demanding a constantly increasing supply of Peanuts, but that older Peanut producing regions in the United States are not keeping pace with the demand.

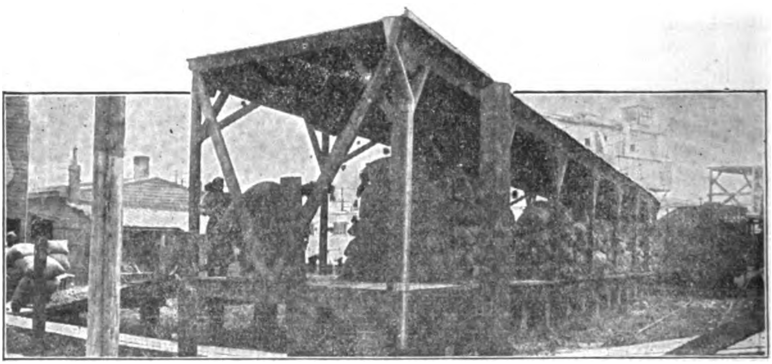
U. S. Should not Have to Import Peanuts and Peanut Products:

Since Peanut oil is one of the most important of the world's food oils, millions of bushels of Peanuts are consumed for that purpose. As further proof that we are not growing enough Peanuts in this country, it may be noted that for the year ending June 30, 1914, there were imported into the United States 44,549,798 pounds of Peanuts valued at $1,899,237 and 1,137,136 gallons of Peanut oil valued at $918,614. In 1911 we purchased from France alone $1,256,000 worth of Peanut oil. In Marseilles, France, there are 42 Peanut mills with a crushing capacity of 650,000 tons of Peanuts annually. Peanut butter manufacturers alone use more than a million dollars worth of shelled Peanuts. One manufacturer of Peanut butter used 130 cars of shelled Peanuts last year for the production of six million jars of Peanut butter. America ought to be exporting Peanuts, Peanut oil and cake instead of importing them, but this is out of the question so long as our Southern farmers do not even grow enough Peanuts to supply our home demand.

A full measure of Peanuts. To get the full measure of profit from your fields, use V-C Fertilizers and "Increase Your Yields Per Acre."

Oil Mills Want More Peanuts:

The Texas Industrial Congress recently addressed an inquiry to the Cotton Seed oil mills of the South, asking them if they were preparing to crush this year's Peanut crop, and what quantity of Peanuts each expected to handle. Out of 47 mills that made reply, 27 stated that they will be in the market for Peanuts in quantities ranging from 10,000 to 40,000 bushels. One mill alone will handle 2,000,000 bushels of Peanuts if it can get them, and another mill paid a quarter of a million dollars for Peanuts in 1916, and now wants a million dollars worth of Peanuts this year, but doubts if it can get them.



Peanuts by the carload. Shipping Peanuts to the Northern market from a Suffolk, Virginia Peanut Factory.

In 1916 an Alabama Peanut Milling Company installed a Peanut mill, but for lack of Peanuts was only able to operate for two months. This company bought up all the Peanuts it could find, and hopes this year to be able to get a sufficient supply of Peanuts so that they can crush Peanuts for at least six months instead of only two. Some oil mills are not only buying all the Peanuts they can find in their sections, but they are even buying Peanuts for seed, and distributing them to the farmers so that they may have a sufficient supply to run next season. The Peanut oil proposition fits into their business very nicely because the Peanuts, when properly cured and handled, can be stored until the cotton seed crushing is entirely out of the way.

Does not the above indicate that there is not a sufficient supply of Peanuts in this country to meet the existing and growing demand for same? However, the awakening seems to have come,

and that today the farmers of the South are beginning to recognize the advantages of growing Peanuts and more Peanuts. As one prominent authority on Southern crop conditions says: "Peanut oil is attracting almost as much attention in the South today as fuel oil, only you don't have to dig so deep to get it."

Why it Pays to Grow Peanuts:

Now let us see why it pays to grow Peanuts, and what results have been produced with Peanuts in the South.

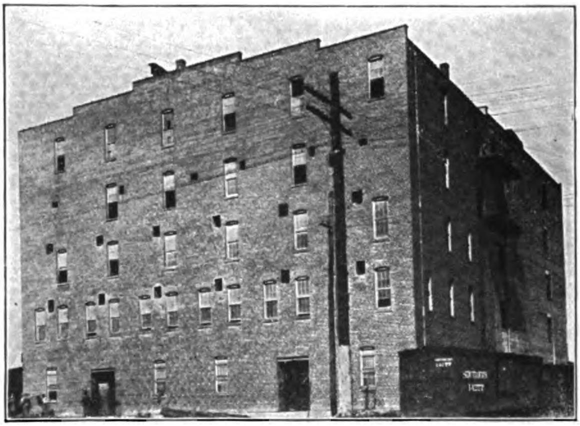
The present European conditions indicate that but small importations may be expected from abroad. The high price of food products, especially such animal products for which Peanut Products may be substituted, necessarily will create a demand for both Peanut oil and cake, and their products. Every indication points to high prices for Peanuts for at least several years to come, and every Southern farmer should grow several acres of Peanuts, while many can safely let this crop become an important one on

A well cultivated field of Peanuts with no weeds. Good cultivation and the liberal and wise use of V-C will, with proper weather conditions, produce a splendid crop such as shown above.

their farms. There is a steady demand for planting seed, and should the local market not prove satisfactory they may be shipped to oil mills or consumed on the farm by the live stock, including poultry, or they may be made into palatable and nutritious dishes for human consumption. In fact the Peanut crop is one of the

safest which the Southern farmer can grow for either sale or consumption at home, since it is drouth resistant; gathers nitrogen from the air; enriches the soil; is easily and cheaply grown; is adapted to a great variety of soils; is a profitable crop on land that is too poor to produce profitable crops of corn or cotton, wheat or oats; and besides its value as a human food, the Peanut or its vine may also be profitably fed to every animal on a Southern farm. It furnishes hay and grain, meat and bread, protein and carbohydrates, oils and fats and ash food constituents necessary for the feeding of all farm animals.

It is safe to predict that the Peanut is destined to play an increasingly important part as an American field crop, as its value for various purposes becomes better appreciated and the methods of its culture are better known.



Another Peanut Factory in Suffolk, Virginia. That such large and modern buildings are devoted to the Peanut Industry is concrete evidence that the Peanut Industry is here to stay and will increase at a rapid rate.

Five Avenues of Profit:

Dr. J. N. Harper, Director Farm Service Department, tells us that the Peanut crop offers wonderful opportunities because it can be grown profitably over the entire South; that it reaches its perfection in growth and yield in the territory which is either occupied or is being rapidly encroached upon by the boll weevil; that there is a constant demand at a "Cash Surrender Value" from a market that would be difficult to glut with the Peanut, because of the five avenues of profit which he summarizes as follows:

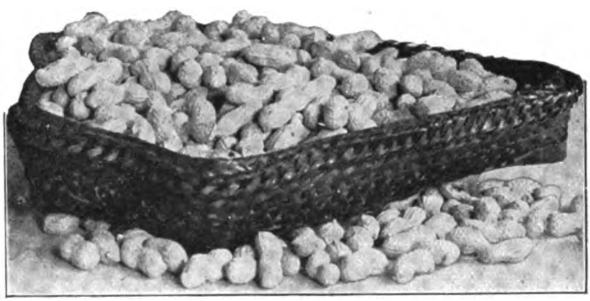
First—Progressive oil mills throughout the South are eager buyers of the Peanut and offer a spot cash market at very remunerative prices. The oil is in great demand.

Second—The nut and vines are a splendid feed for cattle, producing a quick growth of firm and tender meat. A profit in the sales of cattle thus fed and fattened is a certainty.

Third—The best quality of Peanuts find a ready sale at top prices to the manufacturers of candy, of Peanut butter and other confections.

Fourth—Peanut cake (from the oil mills) fed to hogs makes a vigorous growth and gain in weight, and when properly "finished off" with corn gives a firm meat, with the fat containing a proper proportion of stearine for making good firm lard. Feeding the whole nut to the hog is a mistake for two reasons: First, the value or profit from the oil is lost; second, the oil of the nut gives an excess of oil over stearine and produces in the hog a soft, flabby meat, the fat of which will not produce lard of a proper consistency.

Fifth—The Peanut being a legume, is a soil builder and adds nitrogen to the soil and works in splendidly with a rotation with cotton or with corn.



The Peanut is a very nutritious and palatable human food, and is largely known today in its roasted-in-the-pod form and as Peanut butter. As the demand grows the Peanut growers will be obliged to produce more to meet the demands. The use of V-C will help them increase their yields.

Champion Peanut Growers:

It remained for a 14-year-old Texas girl to achieve the distinction of being the World's Champion Peanut Grower. Miss Emma D. Stokes, of Henderson, Rush Co., Texas, grew 11,294 pounds of Peanuts and vines on one acre of ground, the roots measuring 232 bushels. Miss Stokes received a prize of $300.00 for growing this heavy yield. An interesting fact associated with this record by Miss Stokes is that her acre of Peanuts was one-third more

profitable than the prize acre of corn, and nearly forty per cent. more profitable than the prize acre of cotton grown in Texas the same year.

A Texas boy, Calvin Brooks, of Paducah, Cottle Co., was another Peanut growing prize winner. He grew 160 bushels of Peanuts on one acre at the exceptional low cost of 8 cents per bushel, which included cost of seed, team hire, land rental, labor, cultivation etc.

Another Champion Peanut grower is Miss Oro Mae Stokes of Henderson, Texas. On her prize acre Miss Stokes used 100 pounds of Commercial Fertilizer, and produced 4672 pounds of air dried nuts and vines, consisting of 1962 pounds of hay and 9032 bushels of nuts. This is indeed a splendid record.

No Wonder Alabama is a Big Peanut State:

A prominent Alabama farmer, Mr. A. M. Green, of Clayton, has been growing Peanuts successfully for 35 years, and during that period has never had a failure of the crop.

Mr. Batson, an Alabama grower, had 100 acres in Peanuts, using ten tons of Fertilizer. He says that the Peanut is the cheapest and most profitable crop he ever grew. From the 100 acres of Peanuts he saved a little over 6,000 bushels of Peanuts. Including a fair rent for his land he believes this crop of Peanuts did not cost him more than 20 cents per bushel. He sold every bushel of his crop; liquidated a $2,000 debt; bought a good Peanut picker and other Peanut machinery, leaving him enough money to run his farm the following year without borrowing a dollar. Mr.

Batson left enough Peanuts on his land to fatten his 100 head of hogs, which at a reasonable price he estimates will bring him $1,000. In addition to his Peanuts he also had about 100 tons of Peanut hay which he sold right at his door for $10 a ton. He says it is splendid hay for mules and cows.

Peanuts on farm of Mr. J. T. Rammage, Brundige, Alabama. Compare this crop with that shown on Page 12. Mr. Rammage used V-C Phospho Plaster on the above Peanut Crop.

Mr. J. M. Chancey, another Alabama farmer, planted about 50 acres in Peanuts. He averaged between 60 and 70 bushels of Peanuts per acre. Mr. Chancey bought a Peanut picker machine which he says will enable him to pick enough of his neighbors' Peanuts this season to pay for the machine, which cost him $600, including all attachments for sacking and cleaning. His Peanut crop was a little over 3,000 bushels, all of which he sold at 75 cents per bushel, bringing him about $2,500. Mr. Chancey said the year before he was more than $1,500 behind, but since growing Peanuts he will pay off his debt and have enough money left to furnish his farm next year. His Peanut hay he sold at $12.00 a ton, which of course he says is cheap, but he does not figure that it cost him anything. Also said he was going to raise hogs now, since it was no trouble to raise hogs when growing Peanuts.

The Many Uses of the Peanut

Peanuts furnish hay, meats, oil, cake and shells. The hay is fed horses, mules, cattle, sheep and goats. The meats furnish cake and meal which serve as one of the best concentrates for feeding horses, mules, cattle, sheep, goats, hogs and poultry. The meal furnishes a flour for making various kinds of breads, crackers, cakes, pies and many other palatable and highly nutritious dishes for human consumption. The shells are also used in tin plate manufacture.

The shelled nuts and meats produce vegetable meat substitutes (both leans and fats), Peanut butter and crude oil. The oil furnishes several grades of refined oil, used for salad and cooking oil, lard compounds, hydrogenated and hardened vegetable lard and soap, etc.

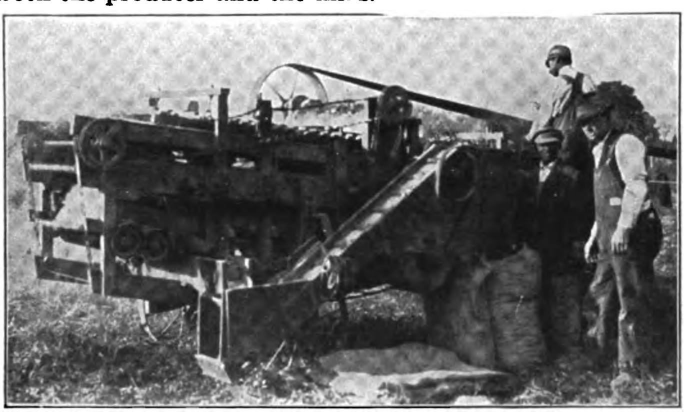
The Bunch Peanuts have an upright growth of vine and produce a mass of pods in a cluster about the base of the stem of the plant.

Peanut oil is used for packing olives, sardines, etc., and it also furnishes winter oil and emulsions for medicinal purposes. It is also used in the manufacture of silk, kid gloves, etc. The residues from Peanut oil is known as soap stock which produces washing powder, acidulated or black grease, fat acids, stearic acid, candle pitch, composition roofing, roofing tar, linoleum, oil cloth, insulating materials, cheap paint base, a substitute for linseed oil, and oleic acid.

Peanut Oil and Meal

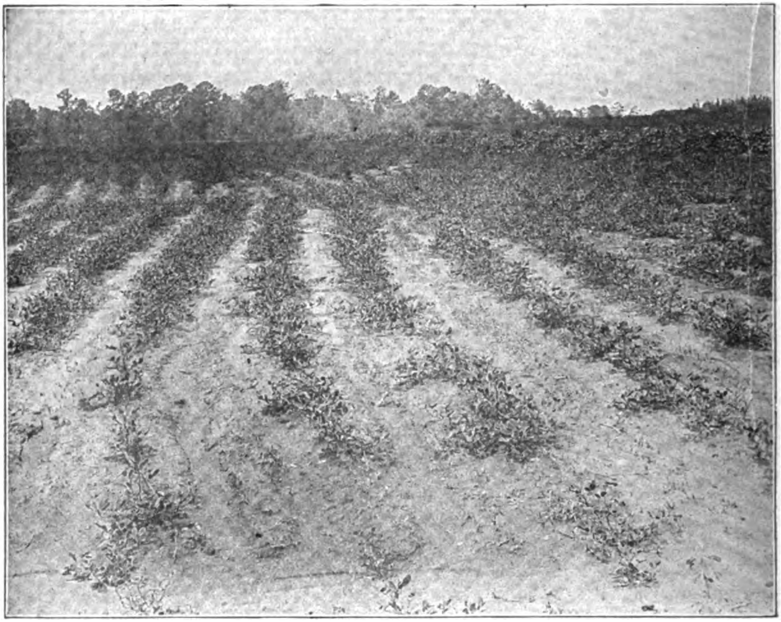
Supply not Equal to Demand:

Vegetable oils are in great demand and the demand is not only increasing, but every indication leads to the belief that the demand will not soon be equalled by the supply. The same is true of oil, cake and meal. The superiority of Peanut oil and meal over other similar and competitive products is responsible for the present rapid development of the Peanut oil industry in the South. The excellent adaptation of both soil and climate to Peanut growing throughout the cotton producing States, and the fact that cotton oil mills with simple and inexpensive change are perfectly adapted to the crushing of Peanut oil, solves in advance the problem of facilities for making Peanut oil and meal. With the addition of Peanut cleaning and shelling machinery the mills may be run throughout the year. This permits of a more economic operation of the mills which will lead to better profits for both the producer and the mills.



Picking Peanuts on farm of Mr. W. J. Cotton, Chuckatuck, Va. Mr. Cotton is a V-C user, and so is always assured of a generous yield of high grade Peanuts.

An official of a prominent Georgia oil mill which operated exclusively last year on Peanuts says that the Peanut industry has come to stay, and advises farmers to grow Peanuts whether the

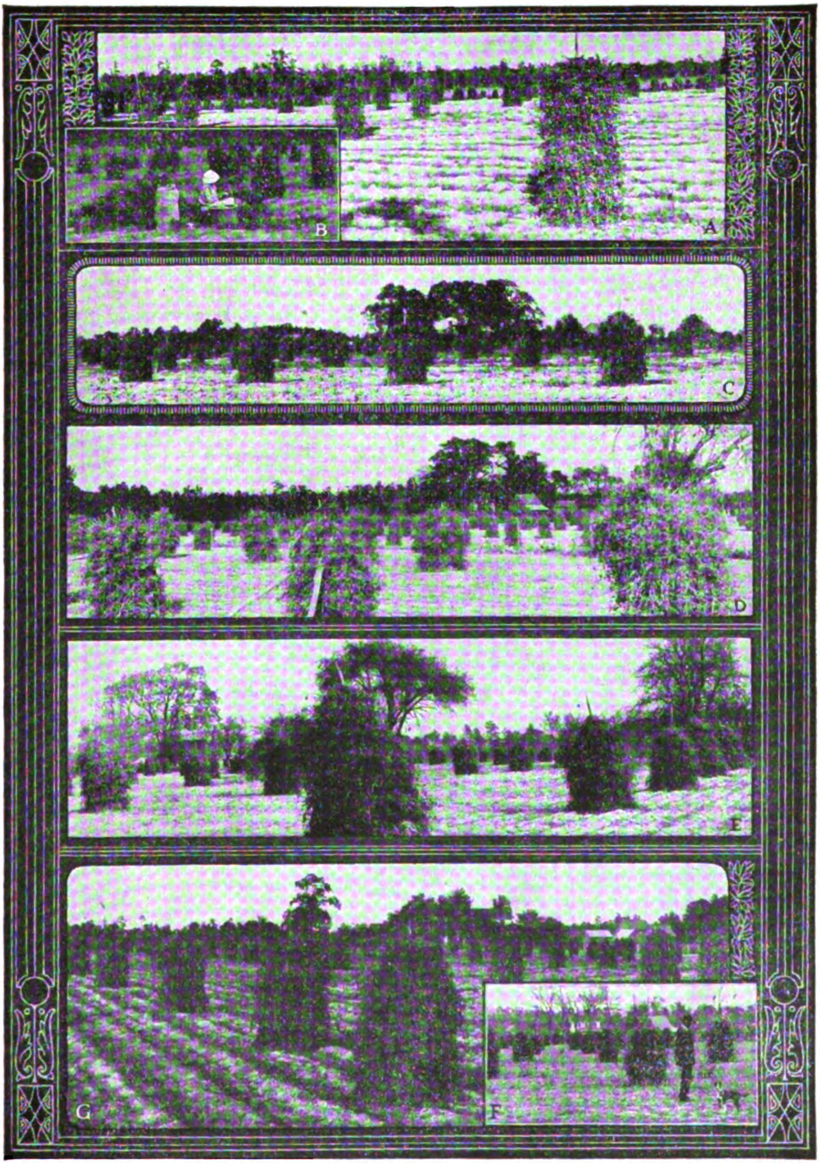


View of a field of Peanuts in same locality of Mr. Rammage's farm. No V-C was used on this field, and its poor condition indeed shows it.

boll weevil is present or not, for peanuts, he says, can be made a great source of Profit.

Spanish Peanuts are about half oil, and the modern presses extract about 44% of this. Cleaned and shelled farmer's stock Peanuts will yield per ton 350 to 400 pounds of first-grade edible oil; 175 to 200 pounds of second-grade oil; and 800 pounds of Peanut cake, the latter having a food value about equal to cotton seed meal. One bushel of Spanish Peanuts yields about one gallon of oil worth from $1.50 to $2.00 per gallon retail. It is the experience of many farmers that the hay resulting from an acre of Peanuts will pay for the cost of production of the crop, leaving the Peanuts a clear profit.

Mr. W. R. Beattie, Agricultural and Industrial Commissioner, is recognized as one of the best authorities on Peanuts in this country. He recently pointed out in the Manufacturer's Record



A few crops of V-C users in Walters, Va.:
- A. Stacked Peanuts of A. H. Jenkins.
- B. Picking Peanuts by Hand on Farm of A. M. Duck.
- C. Field of G. W. Bradshaw.
- D. J. Johnson, Pres. of Farmers Union is the owner of this splendid field of stacked Peanuts.
- E. These stacks belong to Elihu Lankford.
- F. S. A. Barrett and dog inspecting his Peanut stacks.
- G. Another view of Mr. Barrett's Peanuts.

that if the farmers of Texas were to plant 2½ million acres of Peanuts, and only make a yield of 40 bushels to the acre, they would produce 100,000,000 bushels of Peanuts, sufficient to yield more oil than is now obtained from 2,000,000 tons of cottonseed. Furthermore, these 2,500,000 acres of land will yield more oil than is now obtained from 12,000,000 acres of cotton.

Peanut oil is the highest type of edible oil, and is equal to olive oil; in fact many prefer a pure Peanut oil. In view of its wholesome, palatable and nutritious qualities there should be a decided increase in the consumption of Peanut oil as a food.

Most children know that the Peanut tastes good and is nutritious, and that's all they do know about it. Not these children though. They know how it grows, and how it is picked and harvested. When V-C Fertilizers are used liberally and judiciously the pods will be plump and well filled.

Peanut Meal Analysis:

One bushel of Spanish Peanuts will yield about 20 pounds of oil cake and hulls, and a gallon of oil. The cake or meal is splendid stock food, especially for young animals, dairy cattle and hogs. If hogs are fed on Peanut cake their meat will not be soft as is the case when they are fed the whole nut, nor will their lard have a high percentage of stearine which packers do not desire. Peanut meal is undoubtedly one of the best protied concentrates. An analysis of the whole pressed Peanut cake or meal gives the following result:

Crude Protein	36 to 43%
Fat	6%
Nitrogen Free Extract	23%
Crude Fibre	20%

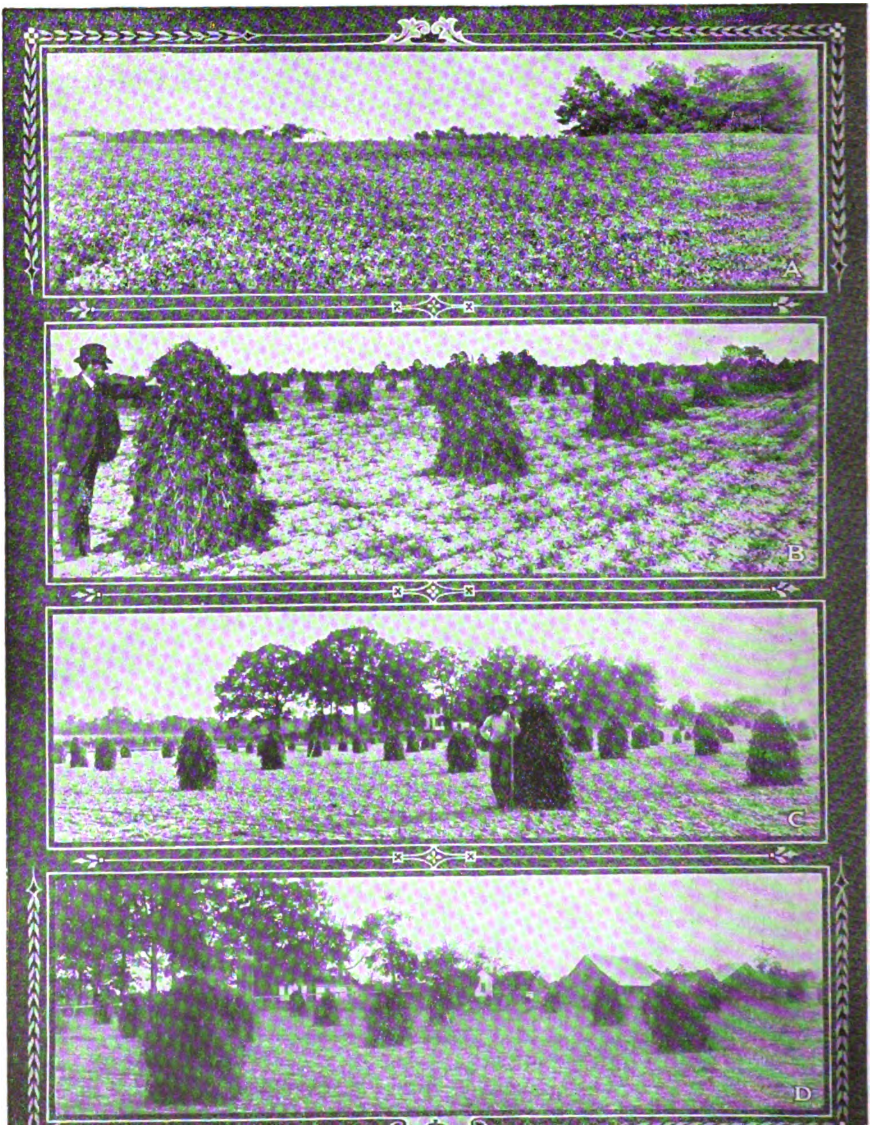
This analysis was from a sample of meal in which the greater portion of the hulls were removed. A ton of whole nuts will yield 1,355 pounds of cake or meal and 525 pounds of oil.

A good plant of the Virginia Runner variety. After the Peanuts are picked the vines make an excellent stock-food almost equal to Alfalfa or Cowpea hay in feeding value.

Value of Peanut Crops for Feeding Purposes

A Crop With no Waste:

There is not an ounce of the Peanut crop which can not be utilized to advantage on the farm. Roots, stems, leaves and peas or nuts are all good for feeding purposes, and an excellent


A
B
C
D

These fine stacks of Peanuts in orchard of J. B. Bland, of Walters, Va., show the result of applying V-C.

hay is produced from the tops of the Peanut plant when cut and cured in the same manner as other legumes. By proper cultivation of the Peanut crop it is possible to produce from one to two tons of hay to the acre. Peanut hay brings from $10 to $20 a ton on the market. Valencia, Virginia Bunch, and the Spanish varieties are the best suited for hay. At the Experiment Station of the Tuskegee Normal and Industrial Institute in Alabama one and one-quarter tons of cured hay was produced on an acre of Peanuts, in addition this same acre produced 59 bushels of nuts. The feeding value of hay compares favorably with the best clover, timothy, cow pea and alfalfa hays, as the following table prepared by the U. S. Department of Agriculture shows:

Analysis of Peanut Hay and Other Hays

Dry Matter	Protein Per Cent	Carbohydrates Per Cent	Fats Per Cent
Peanut Hay	11.75	46.95	1.84
Peanut, entire Plant	13.48	36.28	15.06
Clover Hay	12.84	48.31	2.11
Timothy Hay	7.17	52.94	1.97
Cowpea Hay	19.72	45.15	4.04
Alfalfa Hay	16.48	42.62	2.03

The following table shows the comparative value of the Peanut and other feeding materials, as also prepared by the U. S. Department of Agriculture:

Analysis of Peanuts and Other Feeding Materials

Dry Matter	Protein Per Cent	Carbohydrates Per Cent	Fats Per Cent
Ground Corn and Oats	9.6	71.9	4.4
Corn Meal	9.2	68.7	3.8
Wheat Bran	15.4	60.4	4.0
Cottonseed Meal	42.3	23.6	13.1
Peanut Kernels	26.6	16.7	42.0
Peanut Vines	10.0	42.0	3.6
Clover Hay	12.4	33.8	4.5
Alfalfa	14.3	42.7	2.2
Peanut, whole Plant	18.4	40.1	21.5

The Value of Peanuts for Pork

Value Demonstrated:

In practically every Southern State the value of the Peanut for pork production has been demonstrated, and the time is not far off when the Peanut and Peanut Meal will constitute a large proportion of a ration employed for the production of millions of hogs. For this purpose the Spanish variety is most admirably adapted, as this variety adjusts itself to almost any character of soil, and may be profitably produced without the application of lime, so necessary to the development of the eating varieties. Another advantage of this variety for pork production is that it is earlier than the larger pod varieties, and that it is not necessary that the nuts be ripe before they are grazed by hogs. This will lengthen the period through which they may be grazed by a month or more.

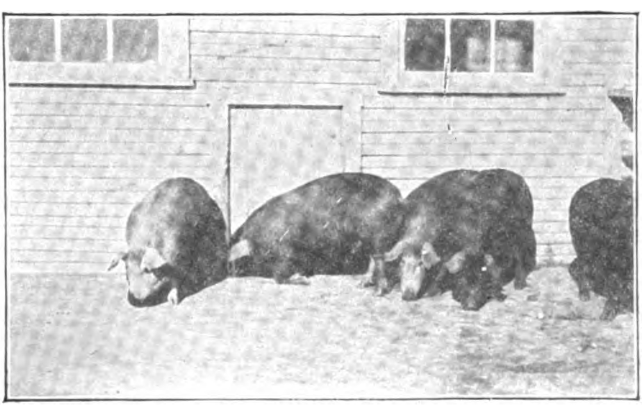
Actual Hog Feeding Tests:

During the past year the North Carolina Experiment Station experimented with damaged Peanuts as a ration for hogs, and compared this feed with wheat shorts. Beginning with the first

of March one lot of hogs was fed with a ration consisting of two-thirds corn and one-third damaged Peanuts. The other lot was fed on a ration of two-thirds corn and one-third wheat shorts. The experiment was brought to a close October 1st. It required 190 pounds of corn and 95 pounds of Peanut to register a gain of 100 pounds, while on the other hand it required 246 pounds of corn and 123 pounds of wheat shorts to produce the same gain. Figuring the value of corn at a dollar a bushel, wheat bran at thirty-two dollars a ton, and damaged Peanuts at twenty-five cents a bushel, it cost $6.73 to produce 100 pounds of pork when wheat shorts was fed, and only $4.45 when Peanuts were used.

The Alabama Experiment Station found that it cost over 7½ cents per pound to fatten hogs on corn alone, while hogs pastured on Peanuts cost less than 2 cents for every pound of gain; that hogs gained as much from an acre of Peanuts as from 57 bushels of corn. At the Arkansas Experiment Station a bunch of hogs gained 1,252 pounds from an acre of Peanuts, while an acre of corn produced only 436 pounds gain. At the Louisiana Experiment Station hogs gained 850 pounds to each acre of Peanuts. An acre of good Peanuts will produce as much pork as three acres of average corn. No trouble about gathering the crop. Just mow the tops for hay and let the hogs gather the nuts themselves.

It has been fully demonstrated that the Peanut is unsurpassed as feed for hogs, and that pork can be made more cheaply upon them than any other feed. From 800 to 1,200 pounds of pork, worth 8 cents a pound, has been produced on an acre of Peanuts,

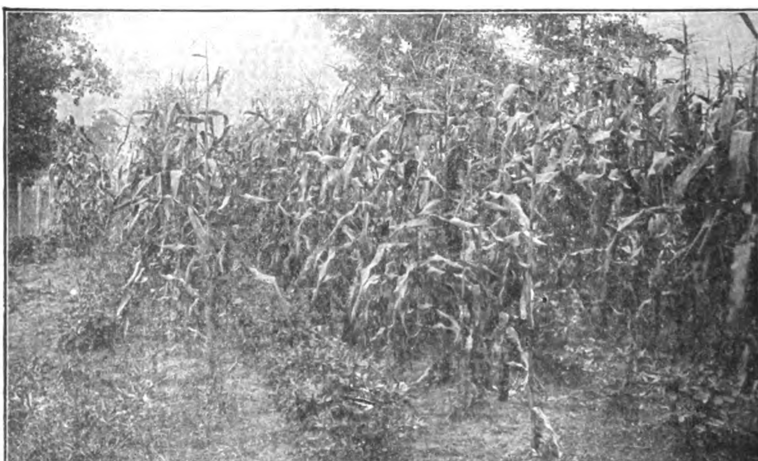


A group of typical Peanut-fed Hogs.

and at the same time the land was so improved that it yielded 1,400 pounds of seed cotton the following season as compared with 750 pounds on adjoining land. The present high price of pork insures even higher profits from the conversion of Peanuts into pork and lard.

Where Peanuts are harvested in the usual manner they remove more plant food from the soil than they add, and are more or less a drain upon the fertility of the soil. If the Peanuts are gathered by the hogs when the soil is not too wet thay are a positive benefit. Four to six dollars an acre will cover the cost of growing Peanuts for hogs, and 800 pounds of pork can easily be made on each acre of Peanuts. Add to this cost the interest upon the investment in the land and cost of fences, and you still have 100% profit in the production of Peanut fed pork.

Experiments have shown that pigs require 1.77 pounds of corn to make a pound of gain in live weight when pastured on Peanuts; 3.07 pounds of corn when pastured on cow peas; and 3.7 pounds of corn on sorghum. An acre of Peanuts should produce between 800 and 1,250 pounds of pork. A great many people of excellent judgment and taste much prefer ham and other pork from corn fed hogs rather than from Peanut fed animals and vice versa. Thus you are assured of a good market regardless of whether your hogs are corn fed or Peanut fattened.



Peanuts may be planted between the rows of corn, and very slightly, if at all, lower the yield of corn. The Peanuts may be harvested, or hogs may be turned into the field to feed upon them and upon any corn that may remain ungathered.

The Peanut a Nutritious and Palatable Human Food

Another Avenue of Profit:

Though Dr. Harper pointed out five avenues of profit for the Peanut, he failed to mention one very important and profitable use that can be made of the Peanut, and that is as human food.

Notwithstanding the fact that the Peanut has penetrated the whole of the United States in its parched-in-the-pod form and as salted Peanuts, and is known to practically every man, woman and child, and relished by very nearly all, it has not become popular in the hundred and more ways it may be served. Its lack of popularity and its limited use as human food in many forms is due solely to the lack of information—ignorance, if you please—on the part of those who are responsible for preparing and serving food in public places and in the home. The Peanut is one of the richest in protein of the many human foods from vegetable sources, containing about 26%, and in addition is the richest in fats, the per cent of which varies between 40 and 50 in the kernels, which also contain 17% of carbohydrates and about 2.5% of ash. Chemical analysis shows the Peanut to be one of the most nutritious of foods, one which will furnish the elements of food contained in lean meats and breads combined. Peanuts are superior to beans, peas, etc., which are staple articles of food, and may be prepared in many ways for the table that beans and peas cannot be prepared.

The Peanut is destined to become one of the most important field crops, when its wide range of uses and its value become better known. V-C will help you "increase the Yield Per Acre" and quality of your crop

Peanut Recipes:

Director G. W. Carver, of the Tuskegee Normal and Industrial Institute, Alabama, has given a great deal of study to the Peanut and its food values. He believes that by reason of its superior food value the Peanut will eventually become a prime essential in every well balanced dietary. He has made up 105 recipes for preparing the Peanut for human consumption. A few of these he has prepared recipes for are the following:

Peanut Soup,
Puree of Peanuts,
Peanut Bread,
Peanut Rolls,
Peanut Cookies,
Peanut Muffins,
Peanut Doughnuts,
Peanut Butter,
Peanut Stuffing,
Peanut Salad,
Peanut Ice Cream,
Peanut Frappe,
Peanut Fruit Roll,
Peanut Cake,
Peanut Pudding,
Peanut Patties,
Peanut Omelet,
Peanut Pie Crust,
Peanut Butter Candy,
Peanut Filling for Cakes, etc.,
Peanut Brittle,
Peanut Cream Cheese,
Peanut Coffee,
Salted Peanuts.

Modern Peanut Culture

A Big Peanut Growing Territory:

The Peanut may be successfully grown in Maryland, Virginia and North Carolina east of the mountains, and in Tennessee west of the mountains, in western Kentucky and in the lower part of Illinois as far north along the Mississippi River as East St. Louis, and then west through the southern half of Missouri and Kansas, New Mexico and Arizona and throughout California excepting the higher elevations. All of Texas, Oklahoma, Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida and South Carolina possess climatic conditions suitable to the profitable growth of the Peanut. See map on page 27. As the food value of the Peanut for both man and live stock becomes better known, the acreage will increase more rapidly.

Climatic Requirements:

While the Spanish Peanut will mature in from 100 to 120 days, the larger varieties or "eating" Peanuts require from 120 to 140

Map of the United States, showing the area adapted to the production of Peanuts.

days. The climatic conditions best suited to the cotton crop are admirably suited to the Peanut; i. e., a long frost-free season, abundance of sunshine, a high temperature, warm nights and a moderate rainfall throughout the growing season.

The Peanut is more susceptible to injury from frost than some of the other summer legumes, and nothing is gained by planting before all danger of frost is passed.

Soil Requirements of Peanuts

The Ideal Soil for Peanuts:

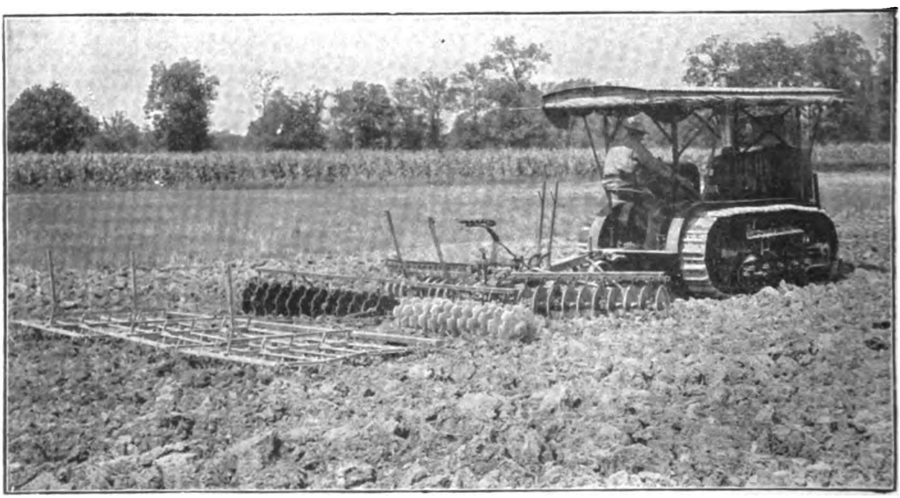
An ideal Peanut soil is a sandy loam, well drained, with an open subsoil and an abundance of lime. The soil should contain neither too low nor too high a proportion of humus, and is preferably of a light grayish color, with a low percentage of iron or other mineral matter that would color or stain the pods. While some soils of dark color will give a high yield of Peanuts, the color of the pods from such soil reduces their market value. Light colored soils produce nuts with clean, bright shells, while red or dark soils naturally stain the hulls and reduce their market price to the confectionery trade. This, however, does not apply to Peanuts intended to be sold as shelled nuts or to a crop grown for oil, meal or stock feed. A sandy loam or even a sandy soil with a

well-drained clay subsoil is best for the Peanut. Neither sour nor poorly drained soils are suited to Peanuts, yet some sandy and wet soils, if well drained and sweetened by the liberal use of lime, will give heavy yields. Soils that are inclined to bake or crust upon the surface are not desirable, since the pod stems (pegs) which descend from the vines cannot penetrate a too-hard surface.

Preparation of the Soil for Peanuts

Good Seed-Bed Important:

The time for plowing land intended for Peanuts will depend upon the condition of the soil and upon the crop occupying the soil before the Peanuts. If the soil has not been sown to a cover crop and is bare in March and April the breaking should be done in time to allow the soil to settle before the seed are planted. If rye or crimson clover occupy the land, these crops should be plowed down a few weeks before the time for planting arrives. Before plowing down the rye or clover they should be well disked, and after plowed down, harrowed and rolled until a good seed-bed is prepared. The seed-bed should be thoroughly broken and well pulverized, but compact.



Preparing a seed bed with the disc harrow, cut-away harrow, and spring tooth harrow. The combination of good seed-bed preparation and the liberal use of V-C Fertilizers will bring splendid returns in bountiful crops.

A Rolling and Pulverizing Implement which puts a field in good physical condition. If any large clods are present this implement breaks them up and also compacts the soil.

Depth Must be Right:

The depth of the breaking should not be less than 6 inches, and often may be 8, though no considerable quantity of clay should be brought to the surface. If the soil proper is not of a desired depth a little deeper plowing each year, for a few years, will give the desired depth without impairing the physical properties of the soil and without causing too great discoloration of the pods by an excess of clay. If the subsoil should become hard or a hard-pan formed, poor drainage may be caused and an acid soil condition would be the result. In such cases it is better to drain the land, but if this is not practicable sub-soiling and liming in the fall or winter will be highly beneficial.

Just Before Planting:

In the final preparation, or just before planting, should it be necessary to rebreak the soil it should be harrowed almost immeately after breaking for the double purpose of reducing the clods before they harden and to conserve the moisture. If, however, the soil is a typical Peanut one, and has been previously well broken, a disc harrow (set so that it will both cut into and turn the soil to a depth of several inches) will give an excellently prepared seed-bed. If much vegetation is present, the surface soil should be first disced and then plowed with a turn plow. If sod or a heavy growth of rye, crimson clover, etc., has been turned down, a good seed-bed may be best secured by the use of both the disc harrow and the acme harrow. If the soil is very loose the roller should be used before planting.

ffolk, Virginia, is the heart of the Virginia Peanut growing area and it is fitting that the Best Fertilizer should be used on the Suffolk Peanut fields. We show here only a few of the many Suffolk farms that use V-C for better and "Increased Yields Per Acre" of Peanuts.

A. Stacked Peanuts on farm of Jesse Williams.
B. Bunched Peanuts after picking—Jesse Williams.
C. C. A. Shoop of the Benthall Machine Company.
D. Field of V-C'd Peanuts. A. C. Oliver.

Level Culture Preferable:

On land best suited to Peanuts level culture is preferable and should always be the rule. The exceptions are when the soil is too wet for their best growth, then it is advisable to throw up a slight bed or ridge. While good soil preparation is most desirable for all crops, it is especially so with the Peanut. If the soil is harrowed every week or ten days for a month before planting time its physical conditon will be vastly improved and many early weeds will be destroyed.

Peanut Rotations and Green Manures

Rotate Often:

Some Peanut growers plant their crop too continuously on the same land and reduce both the yield and quality of the crop. The same land should not grow a crop of Peanuts oftener than once in three years, and a four year's rotation in many cases would be more profitable than a shorter one. The crops which may be most profitably grown will determine what cropping system will enter into the rotation. In the trucking sections these crops will vary widely. A crop of Peanuts may be followed by small grain or crimson clover, and these by cowpeas, soy beans, corn or sweet potatoes, etc. The second year the crops may be cotton, corn, tobacco or cowpeas or soy beans, and these may be followed by crimson clover, or rye, to be disked or plowed down for the second crop of Peanuts. This gives a hoed crop the year before the Peanuts and weeds are killed; or a dense shading crop (cowpeas or soy beans), which will also suppress weeds. The soy beans and cowpeas should be cut for hay, and the rye or crimson clover plowed down for green manure.

Getting Full Share of Profit:

In the Peanut sections the character of the soils best suited to their growth easily becomes deficient in humus, and the supply is best preserved by plowing down a winter cover crop. For good yields of not only the Peanut crop, but the crops grown in association with them, it is necessary that not only the Peanuts but all other crops in the rotation be appropriately and liberally fertilized. However, neither the green manures not the rotation will take the place of commercial Fertilizers and lime, for Peanuts must have a liberal supply of both if the grower is to get his full share of profit.

Profitable Returns:

The use of commercial Fertilizers on Peanuts, like their use on tobacco, cotton and on all other crops, has proven to be an investment rather than an expense, an investment which gives profitable returns in the yield and quality of the crop, and at the same time leaves the land in a good condition for the production of profitable crops growing in association with the Peanut, since this wise policy enriches the soil.

Why to Avoid Stable Manure:

Stable manure should not be used for Peanuts. If the Peanut grower is so fortunate as to have stable manure it should be applied to some other crop, preferably to corn or a truck crop, for it may do the Peanuts more harm than good by the introduction of weeds, by the production of heavy sappy vines, by the development of pops or empty pods, and will often lower the yield if the manure is used in any considerable quantity.

A type of Peanut Picking machine in common use throughout the Peanut States. Such a Picker saves labor, time and money, and lessens the danger of damage to crop by bad weather, by being able to pick an entire crop in a few days' time.

Commercial Fertilizers for Peanuts

Peanut in a Class by Itself:

The most successful Peanut growers are those who best understand the plant-food requirements of this crop, and who realize that the fertilization of the Peanut differs in some essential respects from the accepted fertilization practices with other farm crops. The necessity for the use of lime and the beneficial effects of V-C Phospho Fertilizers and V-C Plaster places the Peanut in a class by itself.

Since the Peanut is a legume it does not require heavy applications of nitrogen. In fact, a slight excess of this element may cause too great a growth of vine and an increased proportion of "pops" or empty hulls, and any considerable excess will have a seriously injurious effect upon both the yield and quality of the Peanuts. This, however, is true with the Spanish variety only when there is a very great excess of nitrogen.

Stacking Peanuts on farm of Jesse Williams, Suffolk, Va. Mr. Williams is a V-C user and his crops show that it pays.

Many Peanut Soils Deficient:

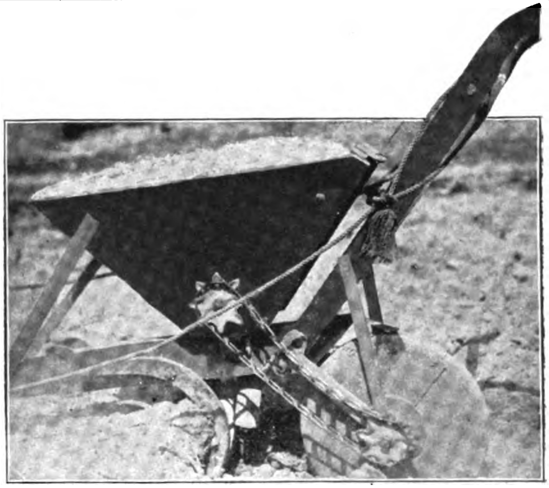
Many of the best Peanut soils are very deficient in both phosphoric acid and potash, and these mineral elements are essential not only to the production of a heavy yield, but to the maturity of the nuts as well. A liberal use of these two elements is often the measure of a full crop of well-filled pods from the soils best suited to the Peanut, since, as previously stated, such soils are naturally deficient in both phosphoric acid and potash unless they have been artificially applied. However, phosphoric acid and potash will give the highest yields of the best Peanuts only when the soil is well supplied with humus. The low yields of nuts in many of the Peanut districts is due to insufficient humus. If the soil does not contain enough humus to regulate the moisture supply in the soil and to make the soil congenial to the crop, Fertilizers will not give the returns they are due to give. Humus keeps the soil in good condition and Fertilizers feed the crop.

Soils That Respond Best:

The soil that is in best condition will best respond to heavy applications of Fertilizers. Such soils contain a good supply of humus, but many of the soils in the Peanut districts are deficient in both humus and nitrogen, and do not make sufficient vine growth to support a full crop of nuts. Such soils should have their humus contents increased by plowing down a green manure crop the fall before the Peanut crop is planted, or by discing and plowing down a winter cover crop a few weeks before Peanut-planting time. So that best results may come from the winter cover crop, such a crop should as a rule be sown early in the fall or even in the summer that good growth may be secured before cold weather sets in. The cover crop may be rye, oats, vetch, crimson clover or similar crops. The cover crop selected should be one that is known to succeed in each locality, and its fertilization should not be neglected. If the cover crop is rye or oats, 500 pounds per acre of V-C Fertilizers analyzing 8-4-4 should be applied; if the cover crop is a legume apply the same quantity of V-C Fertilizers analyzing 8-2-4. Not until the farmers realize the need and the necessity of winter cover crops will they solve the

Mr. C. W. Powell of Walters, Virginia is a V-C "Booster." The above view of his stacked Peanuts shows that he did not choose wrong when he chose V-C.

most important of soil fertility problems; and, cover crops are valuable in proportion to their yields, and their yields are controlled by the available supply of plant food within their reach. Fertilizers applied to cover crops often give as much indirect profit as Fertilizers applied to money crops. Cover crops and Fertilizers lead by the most direct route to permanent soil fertility.



This type of fertilizer distributor is very popular where the fertilizer is applied in the row. The furrow is opened up, the fertilizer drops down through the pipe below, and the wooden wheel in rear incorporates it with the soil.

How and When to Apply Fertilizers on Peanuts:

V-C Fertilizers for Peanut growing contain fertilizing ingredients proven by the experience of the most successful growers to be the best suited for this crop, and they should be applied at the rate of not less than 500 pounds per acre, or the applications may be as heavy as 1,000 or 1,500 pounds. If more than 750 pounds per acre are to be used it is advisable to divide it and make two separate applications, one before planting and one a few days before the first blossoms appear. It is a common practice among Peanut growers to drill the Fertilizer in an open furrow, and then bed and plant. In most cases it would be a better plan to apply the Fertilizer broadcast, for this would not only be a profitable practice for securing a good yield, but would be far better for the general improvement of the land.

Permanent Soil Improvement Best:

Every farmer who uses commercial Fertilizers should realize that the permanent improvement of his soil is of greater consequence than the temporary feeding of one crop. If the amount of plant-food given the land is only enough for one crop the soil will become poorer after each harvest. On the other hand, if more Fertilizers are applied to each crop than it needs the land will become richer and richer each year.

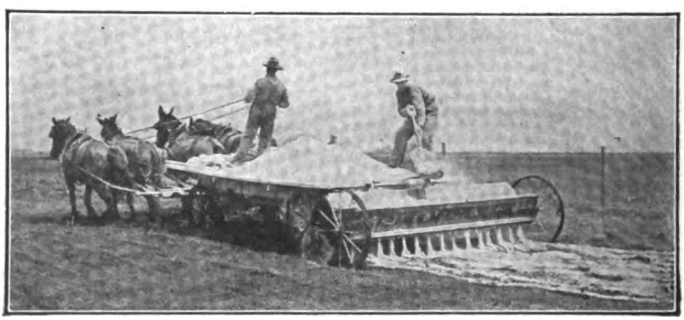
Lime

Sweeten the Soil:

Applications of lime are necessary for the successful production of larger varieties of "Eating Peanuts." Many Peanut soils are inclined to be acid. Peanuts will not thrive in an acid soil, and lime must be applied to correct the acidity. In fact, it is only on rare occasions that soils are found in the Peanut sections containing lime in sufficient quantity to mature a good crop. If there is not enough lime the pods will not be filled out; the proportion of "pops" will be high; and the yield and market value of the crop low. Where oyster shells are abundant these are burned, and the resulting lime found to be good for Peanuts. This form of lime is commonly used by many Peanut growers. Other forms of burnt lime or limestone may be used, and are commonly employed.

Thorough Mixing With Soil:

The quantity of lime to be applied will vary on different soils, and the strength of the lime or its purity and its freshness will determine the quantity to apply. Some apply from 1,000 to 4,000 pounds every three, four or five years, while others apply from 300 to 1,000 pounds in one or two year intervals. In a two or three year rotation with small grain, corn, cowpeas, crimson clover, etc., from 1,000 to 2,000 pounds applied to each Peanut crop will give excellent returns. The lime may be applied broadcast, in the drill, before planting or along the rows after the plants have begun to grow and cultivated into the ground. Probably the



Applying lime to land by means of a broadcast distributor attached to wagon.

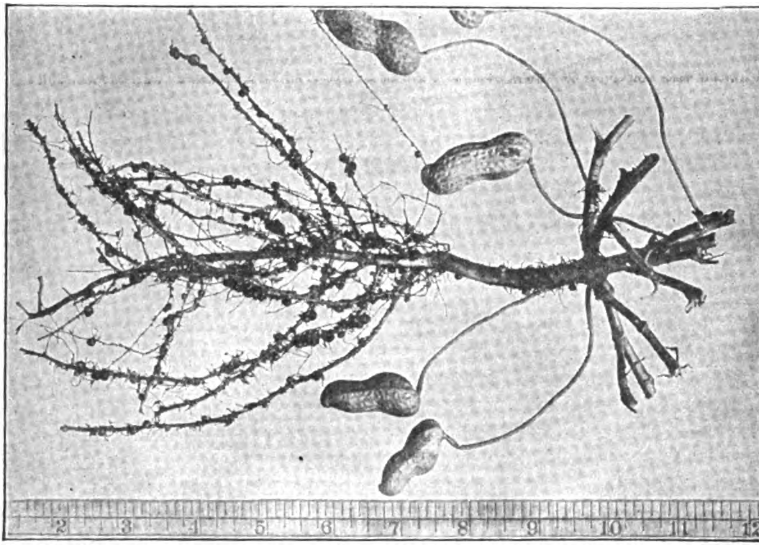
best plan is to apply broadcast. No matter how applied the lime should be thoroughly mixed with the soil. Lime should not, however, be put down at the same time commercial Fertlizers are applied. Heavy applications are recommended, and probably the best time for such applications is when the land is being plowed early in the spring, though some prefer to apply the lime in the fall. If light applications are made these may be applied along the rows after the seed are planted or along the side of the rows after the plants are up.

These men are applying V-C Phospho Plaster on a crop of alfalfa. The same method applies to the application on Peanuts.

V-C Phospho Plaster:

Many successful growers of eating Peanuts have time and time again demonstarted most positively that V-C Phospho Plaster is of very great benefit to the crop, and often is the controlling factor in producing a profitable yield. Abundant evidence of this will be found on page 43. V-C Phospho Plaster is used for the purpose of insuring well filled pods and avoiding the occurrence of "pops" or empty pods, and is applied in July and August. Application is usually made by hand, and the Plaster is sown broadcast over the Peanut plants at the rate of 250 to 500 pounds per acre. V-C Phospho Plaster applied to other crops has also proven very beneficial. The illustrations on page 37 show how it was applied to alfalfa.

Newsoms, Virginia, is another well known Peanut town, and here again we find V-C being used extensively. In spaces A. B. and D. are shown V-C'd crops of John Vicks. E. B. Prince and J. R. Carter respectively. C. shows the digging of Peanuts on farm of V. D. Thorp. and in space E. they are stacking Peanuts on farm of G. R. Oberry. All these farmers are enthusiastic users of V-C. We wish we could show the crops of all our users but space does not permit.



A Runner Variety of Peanuts showing the nitrogen-gathering nodules on the roots. The tops of the plant is cut away leaving the stubs of the branches.

Well to Remember This:

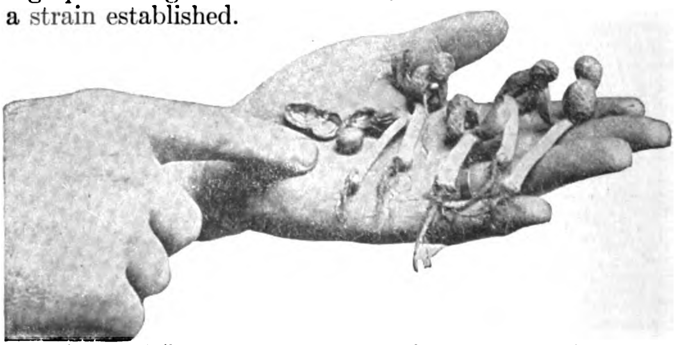
Since the Peanut belongs to the nitrogen gatherers or leguminous plants, many are led to believe this crop is good for the improvement of the land. Theoretically this is true, but in practice rarely true. Since the whole Peanut plant—tops, fruit and even roots—are generally removed when the plant is harvested, the nitrogen gathered and the other plant food ingredients taken from the soil are practically all removed from the field. Practically no humus is left after the crop is harvested, and every grower should realize the necessity of sowing the Peanut fields to a cover crop as early in the fall as it is possible to get the land in shape for sowing. The cover crop will not, however, take the place of commercial Fertilizers, but put the land in a condition to better resist the effects of drought, and give more profitable returns from the liberal application of Fertilizer for the use of the crop following the Peanut.

Peanut Seed and Its Selection

Great Care Essential:

It is more necessary to exercise care in the selection of seed than with many other farm crops. The seed influences the stand, the yield and the quality of the resulting crop. The very best seed from thoroughly mature plants should be selected. These should be cured with the greatest care and kept dry until planting time.

Great improvement may be made in the Peanut by selection. There is a wide variation in a field of Peanut plants. Some are very poor and some are very good, and there are others all through from poor to good. By an inspection of many plants these variations are easily seen, and at digging time the most desirable may be stacked to themselves, and carefully guarded against damage. If 25 or 50 or a few hundred of the best of these plants are carefully planted by the plant-to-the-row method, and the rules of this method followed by the continued selection of the best from the best, high producing seed of superior quality may be secured and such a strain established.



Peanuts should be hulled before planting. If planted in the pod there is not only a waste of seed but they do not come up regularly and may bring the pod above ground and cramp and injure the young plant.

Doubling the Peanut Yield—Profits Quadrupled:

If, by saving the seed from only the best plants, enough are secured for the next year's crop, not only the yield will be increased profitably, but the quality will be improved by securing nuts of more uniform size and shape, fewer pops and greater uniformity in ripening. The improvement of cotton and corn by seed selection in the past few years has added millions of dollars in value

Peanuts should be shelled before planting. To shell them by hand is a slow and expensive job. A sheller that will shell without splitting the seed will soon pay for itself in the saving of labor. Only shelled nuts can be depended upon for prompt germination and a good stand.

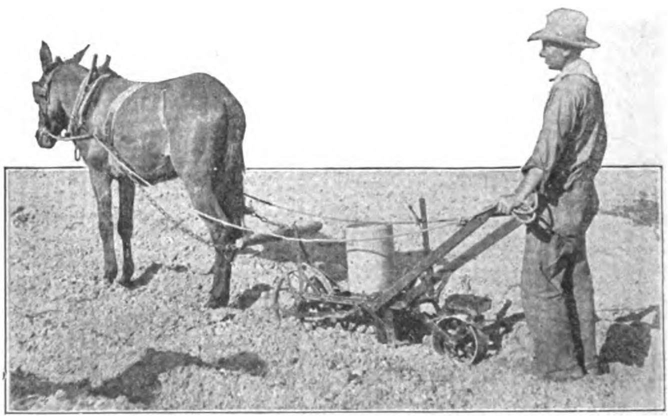
to those crops. The improvement of the Peanut by selection is no more difficult than the improvement of cotton or corn, and may be equally as profitable. As has been demonstrated on the farms of many successful Peanut growers, good seed, good culture, and the proper use of V-C Fertilizers will double the yield of Peanuts per acre and quadruple the profits, as the following shows:

Without Fertilizer one acre produces 30 bushels, at $1.00	$30.00
Cost of producing one acre	25.00
Profit without Fertilizers	$ 5.00

400 pounds V-C Fertilizers with proper cultivation often produces 60 bushels at $1.00	$60.00
Cost of production ($25.00) plus cost of Fertilizer ($8.00)	33.00
Profit with Fertilizer	$27.00

Avoid Crowding and Waste of Peanut Seed:

The eating or large-pod varieties of Peanuts should be shelled before planting, and if this is not done the mechanical Peanut planters now in use will not do good work, since they are made to plant the shelled seed. The whole pods may not be all filled, resulting in a poor stand. The pods of the more common varieties



A popular type of Peanut Planter. Good Peanut seed and V-C Fertilizers are a good team for increased Peanut yields.

usually contain two seeds or more, and more plants than one in a hill causes a crowding that results in lower yields and nuts of poorer quality, as well as a waste of seed. When the unshelled nuts are planted a longer time is required for germination, and they continue to sprout and grow through several weeks, thus interfering with the early cultivation of the field. The above, however, does not necessarily apply to the Spanish variety, since they will bear closer planting, and the pods are invariably well filled and the seed germinate in the pod with less difficulty. The eating or large-pod varieties should be shelled by hand. The Spanish are sometimes shelled by machine, but some of the nuts are spilt, and

thus become useless for seed purposes. Spanish nuts, to be planted in the hull, will germinate more quickly if soaked in warm water for a few hours. If, however, the soaked nuts are not planted within twelve to fifteen hours they may all be lost. Soaking is advisable only when it becomes necessary to plant when the soil is low in moisture. If, however, the soil is very dry the water will be absorbed from the Peanuts and they will not germinate.

Planting Peanuts

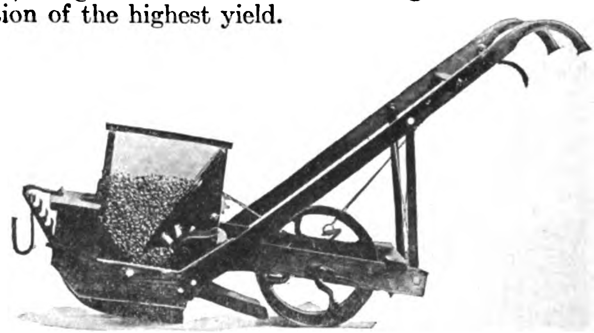
Time to Plant Peanuts:

A good stand is very desirable, and as has been previously advised, good seed are essential alike to a good stand and to prompt germination. Again, there is risk in planting too early. The ground should have become sufficiently warm to insure prompt sprouting, and danger of frost should have passed. The best date for planting varies with the latitude, but it will be found safe to plant Peanuts when it is safe to plant cotton and cowpeas. The Spanish variety may be planted to greater advantage later than the eating varieties, and grain stubble land will be found good for this variety.

This fine stand of Peanuts is on farm of Mr. Alex Parks, Brundige, Alabama. Mr. Parks used V-C Phospho Plaster on his Peanuts.

Distance to Plant Peanuts:

Peanuts, like cotton, should be given more distance on fertile than on poor soil. The usual distance is 36 inches between the rows for the running varieties, and some give a little more, leaving the plants 12 to 15 inches in the drill. If the running varieties require 36-inch rows, the bunch-eating Peanuts may be planted 28 to 36 inches, and the Spanish 24 to 36 inches between the rows. The distance in the drill will vary from 12 to 15 inches for the running, 8 to 12 for the bunch, and 4 to 8 for the Spanish. The Tennessee Red may be planted nearly as closely as the Spanish. The common distances given the Spanish and the bunch varieties is, as a rule, too great with the liberal use of good Fertilizers for the production of the highest yield.



Another type of Peanut planter. This planter uses only shelled nuts which secures better results than when the Peanuts are planted in the shell.

An Arkansas Experiment Station (Bulletin No. 84) found that the yield was greatest when the stand was very thick. This was with the Spanish variety, and some of the results were as follows:

Planted	2	feet by	3 inches gave	118	bushels per acre.
Planted	2	feet by	6 inches gave	98	bushels per acre.
Planted	2	feet by	12 inches gave	90	bushels per acre.
Planted	2½	feet by	3 inches gave	123	bushels per acre.
Planted	2½	feet by	6 inches gave	96	bushels per acre.
Planted	2½	feet by	12 inches gave	91	bushels per acre.

Another test made by the same Station (Bulletin No. 34) on well enriched trucking soil was as follows:

Planted 12 by 4 inches gave	143½	bushels per acre.
Planted 12 by 12 inches gave	102	bushels per acre.
Planted 12 by 24 inches gave	91	bushels per acre.

These were cultivated by hand with a trucker's wheel hoe. It is probably safe to conclude that a stand thicker than customary will give the heaviest yield from the Spanish and from the other bunch varieties, if the soil is fertilized sufficiently well to support the increased yield of vine and nuts.

Quantity of Peanut Seed per Acre.

This is controlled by the distance of planting and the size of the individual nuts. About one peck of hulled Virginia nuts will plant an acre of land of average fertility. A little more than a peck of the Spanish will plant an acre if the distance given is as great as given the Virginia, but they should be thicker, and half a bushel is recommended. This refers to the shelled nuts. If the Spanish are planted in the pods, from two to three bushels, or even more, should be used.

A combination fertilizer distributor and planter. The Fertilizer is applied first, then the seed is laid down and the soil packed firmly by means of the roller which can be clearly seen, also the marker which marks off the next row on left. Where V-C is the Fertilizer used the farmer can be assured of a splendid harvest.

Depth to Cover Peanut Seed:

This depends upon the character of the soil, its preparation and the amount of moisture in the soil at the time of planting. The depth, however, need rarely be less than one nor more than two inches. On heavy soils or soils inclined to crust at the surface, planting should not be more than an inch in depth. In well prepared loamy soils the depth may be about one or one and a half inches; if these soils are dry, two inches may be better. Again,

early planting should not be so deep as later planting, when the soil is dryer. If a rain should occur after planting and before the seed are up a weeder or harrow run across the rows will assist greatly in securing a good stand promptly.

Methods of Planting Peanuts:

Methods of planting vary about as widely as with cotton or corn and many growers may profit by the use of more modern implements. Since the planting of Peanuts is so nearly identical with the common methods practiced with cotton, corn, beans, etc., it is not necessary here to describe these methods. However, as is the case with cotton, corn and bean growers, the Peanut grower may reduce the actual labor and time required to plant at least one-half by the use of a combination Fertilizer distributor and planter, which does all the work from marking the rows, opening and putting down the Fertilizer on through the planting, and does it better. A cotton dropper, or corn, bean or pea planter may be readily adjusted and regulated so as to plant the shelled Peanuts of any of the common varieties grown in the American Peanut section.

Cultivation of the Peanut

Best and Cheapest Cultivation:

The cultivation of the Peanut may be done with the implements used for cotton, corn, and other rowed crops, and in practically the same manner. The cultivation may begin before the plants appear above the ground by going over the entire field with the weeder. This implement will give the quickest, the best and the cheapest cultivation when used while the soil is in the best condition for the use of the weeder. While the plants are in the act of coming up the weeder must be used with the greatest caution, if used at all. When the plants are well up it may again be used to great advantage in some fields.

Conserve Moisture:

The implements in most common use for cultivation are the ordinary spring tooth, hoe or sweep cultivators. The Planet Junior and Iron Age type of cultivators are among the best. These implements should be used after the plants show well along the row. If cultivation is not given as needed the soil surface

may bake and the dreaded crab grass may get a dangerous start. One or two early cultivations with the weeder at the right time will leave the field in the best shape for the later use of the cultivators. Frequent shallow cultivation will conserve moisture, kill weeds and give that looseness of soil surface so beneficial to vigorous and healthy growth. As soon after each rain as the soil is in condition, cultivation should begin and should be pursued rapidly, so as to enable the cultivator to do the best work while the soil is in its best condition.

Work Soil:

After the first few cultivations it is customary to slightly work some soil towards the rows, so that a loose surface may be provided and the best conditions created for the pod-bearing stem or "peg" to enter the soil and form its pod. The practice of throwing earth over the plants probably does harm, and rarely, if ever, does good. For the running varieties the surface should be practically level when laid by, though some make a broad bed with a furrow in the middle for the accommodation of water in case of heavy rains.

The two-horse cultivators, which work both sides of the row, are by far the best implements to use after the weeder. When the vines have begun to spread, use an implement that will cultivate all of the middle.

Good Cultivation and the liberal use of V-C will bring good returns in the form of bigger and better crops.

As soon as the vines begin to peg or form the stems which penetrate the ground and upon which the nuts are formed the vines should not be disturbed. The bunch varieties may be cultivated much later than the vining.

Some hand hoeing is often necessary, but the weeder, followed by the two-horse cultivator, will often dispense with the necessity of using a hoe. Crab-grass is probably the worst weed in Peanut fields, though foxtail is also bad in some localities. After each rain the use of an implement that stirs all the surface of the soil will in most soils, keep these and other weeds in check.

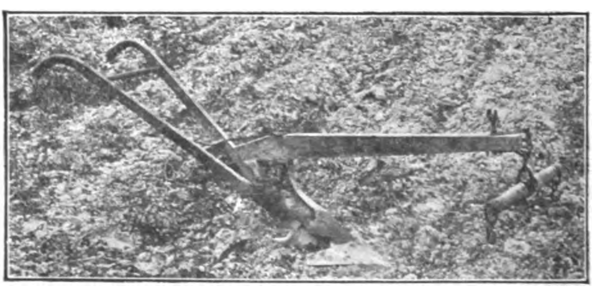
Harvesting Peanuts

Proper Time to Harvest:

Peanuts should be dug when the plants have the greatest number of mature and sound nuts on them. If dug too early the yield may be less and a portion of the nuts will shrink on account of their immaturity, thereby lowering the value of the crop. If dug too late some of the nuts may sprout in the ground before digging, or frost may damage the vines and reduce their value as stock feed. As a rule, however, the experienced Peanut grower will know when the proper time arrives by the yellowing of the leaves, which indicates that their vegetative functions are ended and consequently the Peanuts ripe. It is a safe rule to begin the harvest a little early rather than a little late, since unfavorable weather may occur and delay operations and damage the crop.

Digging or Lifting Peanut Plants:

This is commonly done by the use of a one-horse turning plow, though several types of potato diggers do the work better and at a very much less cost. When the turning plow is used the mould



A special plow for lifting or digging Peanuts.

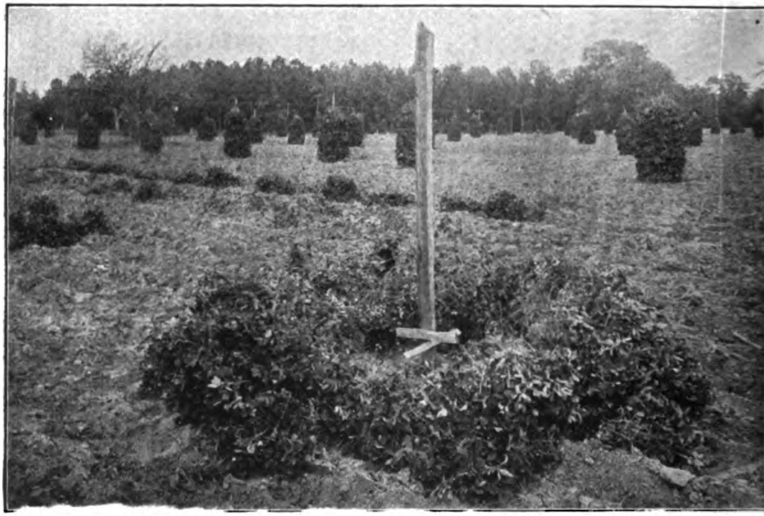
board should be removed and the vines shaken loose by hand and thrown into windrows or small piles. The type of potato plows which have a short mould board terminating in fingers may be used to some advanatge over the ordinary turning plow. Such a digger, with a team and plowman followed by eight hands, should care for about six or eight acres per day.

It has been found by experiment that the regular machine potato digger, drawn by two or three horses driven by one man, will dig from eight to twelve acres a day and do the work in a much cleaner and better manner than the old plow and hand method. This machine not only removes the Peanuts from the ground in a more perfect manner, but also shakes off the soil and leaves the vines lying loosely upon the surface of the ground. By the hand method a great many pods become detached from the vines, while with the machine potato digger scarcely a pod is lost. The running varieties of Peanuts cannot be harvested as perfectly by the above machine, since the vines become clogged on the machine.

Another method of digging Peanuts which is meeting with satisfaction. The vines are dug and placed on a travelling carrier which shakes off all dirt, and then they are dropped in rear of machine. The vines will be well filled with plump Peanuts if V-C is wisely used.

If level or very nearly level culture is practiced in growing the Spanish variety, considerable time may be saved in harvesting the variety by the use of a hay rake, after the vines are loosened by the plow and well wilted, to draw the vines into windrows along

a line where the stacks are to be made. This, however, is recommended only when the crop is to be used on the farm or sold to oil mills, it does not apply to the eating nuts which must be stacked with great care to insure good market qualities.



A Peanut stack taken down. The cross pieces nailed to the lower end of the pole are for the purpose of holding the vines off the ground.

Stacking Peanuts:

After the plants are dug or lifted from the soil they are allowed to lie a few hours before they are stacked, though some growers stack as soon as dug, and the vines have been shaken free of adhering soil. Poles about eight feet high and three or four inches in diameter are set about a foot or eighteen inches in the ground at intervals determined by the number of stack poles necessary for caring for the crop. Cross pieces of wood are nailed to these poles, about six or ten inches from the ground, so that the vines may not come in contact with the wet earth. The stack poles should be firmly set. The vines are stacked about the poles, turning the nuts as much as possible towards the poles, thus protecting them from the weather. In placing the vines about the poles they should be opened and spread, so as to secure a shingling effect, and at the same time enable the vines to cling closely to the poles. The stacks should be as narrow as possible, consis-

tent with protection from rain, so that drying may be hastened. Every precaution should be taken to keep the nuts at all times free from dew or rain, so as to prevent discoloring, which is sure to follow if the pods become wet after digging.

In placing the vines in stacks they should not be packed too closely together, since an abundance of air is essential to good drying and curing. When the vines have been piled to the top of the pole the stack should be protected by binding a few vines together, so that they will shed water, or the stack may be capped with a bundle of grass or straw.

When the Peanut crop is harvested the vines are stacked about poles, placing the nuts in the center of the stack. The Peanuts are placed next to the pole, that the vines may protect them from the birds and rain, and permits the air to circulate so the nuts will not spoil.

When to Pick:

Storing in barns before picking has not proven satisfactory if the Peanuts are intended for market. If intended for stock-feed the crop may be cured in windrows or cocks, and handled in favorable weather as is the practice with soy beans or cowpeas. Picking should not begin before the vines have been in the stack for three or four weeks, and sometimes as long as five weeks. The length of time is, of course, controlled by the weather. If the weather is dry, the wind high and the sky clear, drying will be rapid—may be too rapid. If the temperature is low and it is rainy and cloudy the curing will be slow. If the curing is too

rapid the peas will shrivel and the color of the pods will not be good. Picking from the vines should not begin until the pods are dry and the peas firm. The immature ones will be more or less shriveled and shrunken. Except on rare occasions is there anything to be gained by early picking or early marketing. However, picking may be delayed until the weather damages the nuts, or many may be destroyed by blackbirds and crows or by field mice and rats.

Every precaution should be taken to prevent exposure to moisture after the nuts are cured. If after picking there is any moisture in the pods they should be stored in a well-ventilated building until thoroughly dry. To hasten drying they may be turned over with a scoop or shovel.

Preparing Peanuts for Market:

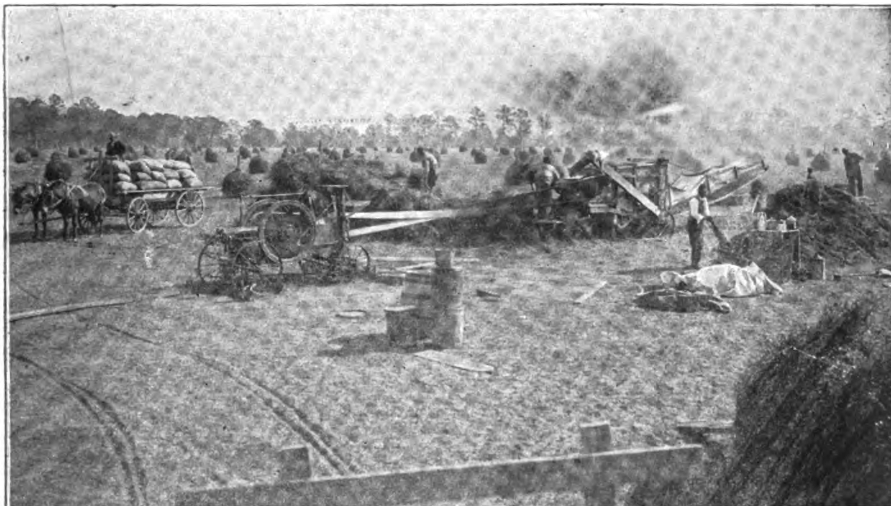
This will be controlled by the use to which they are put. If they are to be shelled it is not so necessary that they be factory cleaned. If intended for the vendor trade they should be subjected to the factory process, which removes all foreign matter and immature nuts, polishes the hulls, and at the same time separates them into grade.

At the present time when man power is at a premium on the farm, every labor saving implement is a necessity. This Peanut Picking Machine operated by five men will pick from 400 to 600 bushels in 10 hours, while these five men picking by hand could only pick 40 bushels in 12 hours' time.

Peanut Picking by Machine

A Great Advantage:

Practically all commercial Peanuts are now picked by machine. The greater rapidity of picking by machinery and the scarcity of labor has driven Peanut growers to the use of machinery for picking the nuts from the vines.



From the Peanut Vine to the Peanut Bag. This view shows the complete equipment necessary for the harvesting of the Peanut. The vines are being put in Picking Machines and the bagged Peanuts being taken from field on extreme left.

A number of machines are in use for removing the Peanuts from the vines. Some of these operate upon the principle of a grain threshing machine, while others are of a picker type which remove the Peanuts by drawing the vines over wire netting. The tendency to operate the cylinder type of machine at too high a speed causes the pods to be broken, but if this type of machine is not allowed to develop a higher speed than about 375 revolutions per minute, and not fed too fast, but little breaking of the pods will result.

The picker type of machine picks the Peanuts by dragging the vines over a horizontal wire mesh, at the same time brushes act on the lower side of screen to remove the nuts.

Comparing Cost of Hand and Machine Picking:

The Peanut picking outfit shown on pages 52 and 53 will pick off on an average of 400 bushels of Peanuts per day of 10 hours, and when conditions are very good from 600 to 700 bushels. About 5 men are required to operate this Peanut picker, whereas if 5 men were to pick the Peanuts by hand, they could pick only about 40 bushels in 12 hours time.

The manufacturers of the machine, shown on page 53, claim that on 160 acres of Peanuts, where the yield would be 50 bushels of Peanuts per acre, of 8,000 bushels, to pick this crop by hand

would cost about 15c. per bushel or $1,200. This same crop picked by this machine they claim would average 500 bushels a day, and the cost of operation would be about as follows: Fuel and oil $1.00, labor of 5 men at $1.50 per day, $7.50, allowing $1.50 for incidentals would make the cost of operation $10.00 or 2c. per bushel, equal to a total expense of $160.00, as compared to cost of hand picking of $1,200.00. Even if this estimate of cost is low for machine picking, were it 50% higher the advantage would still be in favor of machine picking over hand picking.

One of the advantages claimed for machine pickers is that instead of requiring several months to pick a big crop by hand, during which time the Peanuts and vines are liable to be damaged, a Peanut picking machine will get them off in a few days. This prevents damage to Peanuts and vines, as well as enables the grower to get his Peanuts off the field promptly.

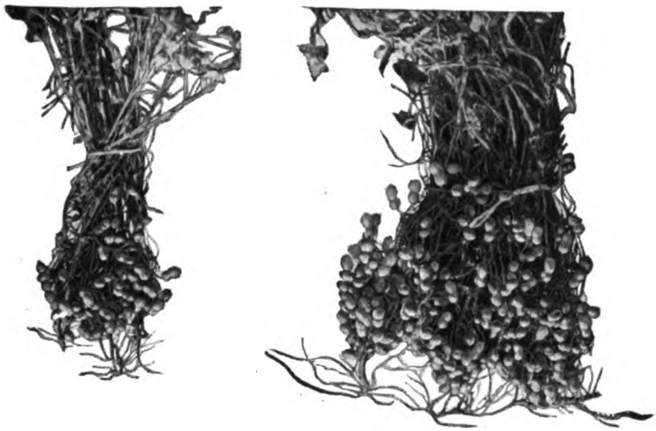
Owing to the present scarcity of labor a machine-picker is almost a necessity. Hand-picking of Peanuts has vanished into the limbo of things that are past, for it is claimed that only about one-tenth of 1% of Peanuts grown in this country are now picked by hand. Hand-picking means losing much of the crop, and a big part o; the profit is paid for wages. Much of the crop is also lost on account of birds and stealing. Loss is also sustained by delay in getting the Peanuts early to market.

Mechanical Peanut Shelling

Time and Crop Saver:

The advantage of a mechanical Peanut sheller is best illustrated by the statement made by an expert that "a boy can shell Peanuts faster with a Peanut sheller than 20 men by hand." There seems to be no doubt about the advantage of planting Peanuts shelled, instead of in the hull or pod. The illustration on page 40 shows that when Peanuts are planted in the hull one kernel usually germinates first, bringing the other kernel out with it for pests to destroy, thus losing the extra kernel. When both kernels germinate at the same time, grow up together, two plants are made in the hill, but—two plants in one hill will yield no more Peanuts than one plant to the hill, so, again, the extra kernel is lost. Shelled seed goes further and comes up more quickly than when planting in hull or pod. Every Peanut grower wants each kernel planted to sprout and produce a plant, therefore, the best way is to plant the shelled kernel or Peanut instead of the whole pod or hull.

Those who have used the Peanut sheller shown on page — say that it is an excellent Peanut sheller, that by shelling Peanuts with this machine the breakage of the nuts is reduced to a minimum. As this sheller removes the kernels from the pods or hulls it also separates the kernels from the pods as shown in the illustration. This sheller can be so adjusted as to shell any size Peanuts. Small, faulty or immature nuts are removed by the attachment of sifter, thus leaving only the well matured nuts.



Two bunches of Peanuts grown by Mr. J. D. Pipkin, Shellman, Ga. The smaller bunch, containing three plants, was grown without V-C. The larger bunch, containing only three plants, was fertilized with V-C Acid Phosphate at the rate of 200 pounds per acre. These two bunches were grown in the same field and under the same conditions. Mr. Shellman says "See what V-C will do."

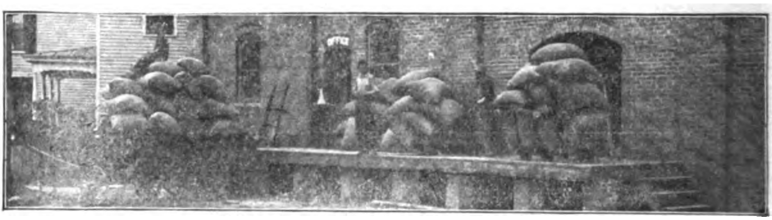
Storing Peanuts

Storing on the Farm:

There has been a strong disposition on the part of a large proportion of Peanut growers to dispose of their crop as soon as it is ready for market in the fall or early winter, when prices are lower than at any other time of the year. This has a tendency to make the market fluctuate and to reach extremes in prices which are not justified by supply and demand. The result is that the producer is paid the lowest price and the middleman reaps the richest harvest in profits. Rather than place all his crop on the market in the first few months after harvest the farmer should hold his crop, or a part of it, and thus aid in stabilizing prices. To do this he must provide storage facilities on his farm, or else be a unit in a co-operative organization with warehouse facilities for storing. A storage house on the farm may be built at a low cost. Such a

building may be constructed of various building materials, though one of galvanized iron roof and sides with wooden frame will be both durable and safer from fire. The floor should be raised sufficiently to insure dryness, the building well ventilated, and all openings wire-covered to exclude mice and rats.

Storing in bags is most convenient for handling and protection of Peanuts. The bags should be piled with alleyways at convenient intervals, the bags in two or three rows between the alleyways, piled not higher than is convenient for handling. Bins for storing the loose Peanuts are used by some growers, and the unbagged nuts remain in these until they are wanted for market, when they are placed in bags. Every precaution should be taken to avoid breaking or crushing the pods.



Loading out Peanuts from a Peanut factory in Suffolk, Virginia.

Storing in Warehouses:

The owners of Peanut factories or recleaners are usually depended upon for cleaning, polishing, sorting and preparing Peanuts for market. The grower sells to the factories, where the Peanuts pass through the various operations from the top floor to the first, where they are graded, bagged and then are ready for storage or market. The modern Peanut warehouse is a more substantial structure than the cheap frame buildings more common in the past. They are of brick, four or five stories high, and of mill construction and often with concrete floors. The distance between floor and ceiling is 10 or 11 feet, and door, windows and roof ventilators are so constructed as to admit fumigation which is given two or three times during the summer. While in storage Peanuts should be protected from moisture and high temperature, either of which will seriously damage them. If stored in too great bulk they are apt to heat and become damaged, but if sacked and piled in a dry room with good ventilation they will keep several years if protected from insects and rats.

These views of the interior of a modern Peanut Factory gives one some idea of the many preparatory steps which are necessary before the Peanut is in shape for marketing. Ample storage space is provided for in the modern Peanut factory and the Peanut undergoes such operations as sorting, stemming, cleaning, roasting, polishing and finally is packed and shipped to wholesale and retail market jobber.

Varieties of Peanuts

Improvement of Varieties Desirable:

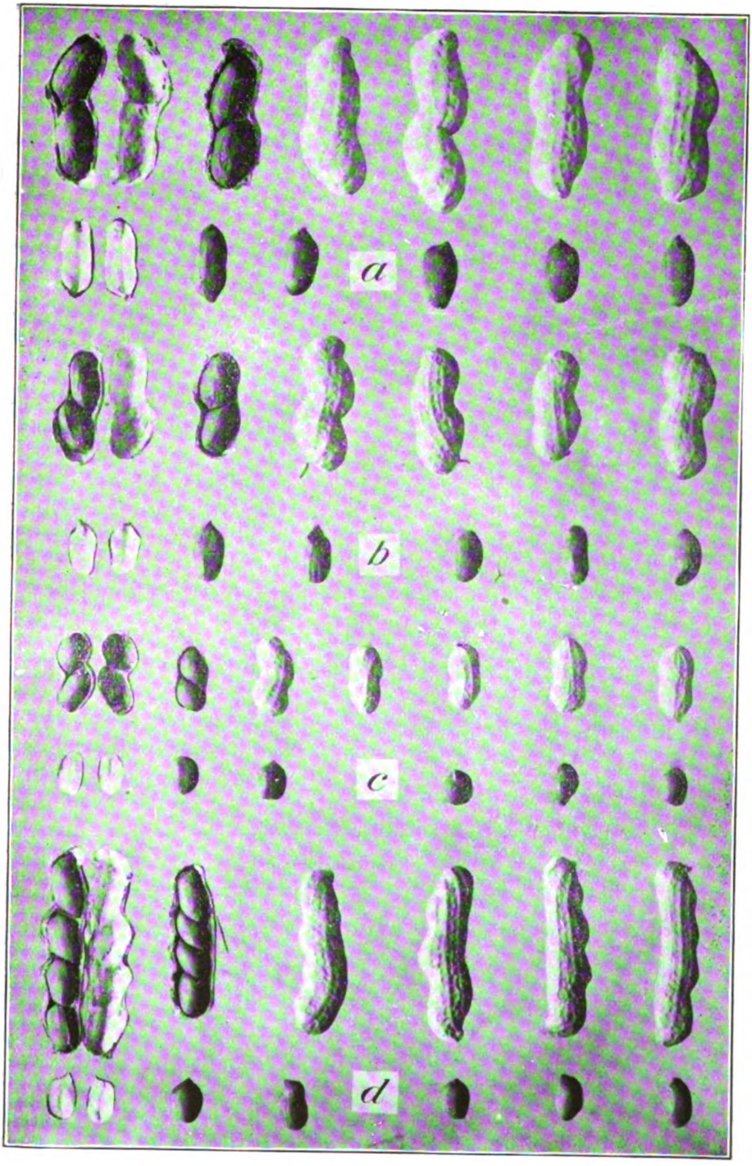
Not enough attention has been given to the development of new varieties of Peanuts, and the varieties commonly grown have been in cultivation for a number of years. As the science and art of developing new and better varieties become better understood it is more than probable that new varieties or strains of existing varieties will be introduced, which will not only yield more per acre but possess qualities and composition which will better adapt them to the many new uses to which the Peanut is now being put.

Varieties in Common Use:

The varieties now in common use are the Virginia Bunch, Virginia Runner, Tennessee Red, North Carolina, Jumbo (a selection from the Virginia), Spanish and the Valentia, the latter a new variety of promise. The Virginia Bunch, Virginia Runner and the Jumbo are in greatest demand for sale as parched or roasted Peanuts, and are also extensively used in many ways as shelled Peanuts. For shelled Peanuts the Spanish, North Carolina and Tennessee Red are popular, the Spanish leading all varieties for manufacturing purposes, and is also more extensively cultivated for oil and cake than all other varieties. No variety is so widely adapted to soil and climatic conditions, or produces as heavy yields as the Spanish. This variety, of which there is more than one type, is the heaviest per measured bushel, weighing 30 pounds per bushel, while the eating varieties weigh 22 pounds to the bushel.

Peanut Acreage and Production in Twelve States

Let us see to what extent the Peanut has been grown in the present 12 leading Peanut growing States, though the Peanut can be grown in many of the States further north. According to the U. S. Department of Agriculture, the Peanut acreage in the U. S. has increased from 868,200 acres in 1909 to 2,084,400 in 1917, and the total production increased from 19,399,000 bushels in 1909 to 60,222,000 in 1917. Divided among the following varieties in the order named, the production in 1915 was:



Commericial types of Peanuts:
A. Virginia Bunch or Virginia Runner. **C. Spanish.**
B. African or North Carolina. **D. Tennessee Red.**
(About one-half natural size.)

Spanish	18,797,000 bushels.
Virginia	17,353,000 bushels.
All Others	3,600,000 bushels.

It is interesting to note in the following tables how the Peanut acreage and production in each of these 12 States has changed from 1909 to 1917, States arranged in order of production:

Peanut Acreage and Production in 1909.

	Acres	Bushels
North Carolina	195,000	5,981,000
Virginia	145,000	4,284,000
Georgia	160,000	2,570,000
Florida	125,000	2,315,000
Alabama	101,000	1,574,000
Texas	64,000	1,075,000
Tennessee	19,000	547,000
Louisiana	25,000	412,000
Mississippi	14,000	285,000
Arkansas	10,000	169,000
South Carolina	7,600	155,000
Oklahoma	1,600	32,000
Totals	868,200	19,399,000

Peanuts—Acreage, Production and Value—1916 and 1917.

	Acres Harvested		Production (bushels)		Total Farm Value. Basis Dec. 1st Price	
	1917	1916	1917	1916	1917	1916
Texas	600,000	275,000	16,200,000	9,075,000	$36,126,000	$13,522,000
Alabama	711,000	300,000	16,013,000	9,000,000	20,016,000	10,260,000
Georgia	255,000	40,000	9,435,000	1,240,000	15,096,000	1,562,000
North Carolina	202,000	205,000	7,676,000	6,970,000	14,047,000	6,970,000
Virginia	165,000	150,000	5,775,000	5,400,000	11,434,000	5,508,000
Florida	40,000	10,000	1,400,000	300,000	2,604,000	336,000
Arkanasas	30,000	23,000	1,110,000	920,000	2,042,000	1,297,000
Louisiana	35,000	33,000	1,015,000	891,000	1,715,000	1,105,000
Oklahoma	17,000	11,000	544,000	385,000	1,083,000	674,000
Tennessee	15,000	16,000	450,000	608,000	544,000	523,000
South Carolina	10,000	10,000	450,000	450,000	1,012,000	594,000
Mississippi	4,000	3,000	136,000	75,000	184,000	95,000
Missouri	400	350	18,000	10,500	47,000	16,000
Total of above	2,084,400	1,076,350	60,222,000	35,324,500	$105,950,000	$42,462,000

Percentage of Varieties Grown:

According to U. S. Department of Agriculture, figures on record 1915, the percentage of varieties of Peanuts grown in each of these 12 Southern States is as follows:

STATE	Virginia Per cent.	Spanish Per cent.	Other Per cent.
Alabama	30	65	5
North Carolina	60	30	10
Florida	40	35	25
Georgia	51	33	16
Virginia	60	35	5
Texas	1	97	2
Arkansas	8	91	1
Louisiana	14	78	8
Tennessee	93	1	6
Mississippi	25	70	5
South Carolina	34	56	10
Oklahoma	5	90	5
Total per cent	43.7	47.3	9.0

The Spanish and Virginia varieties represent 91% of all Peanuts grown, these two varieties running about equal in total production, the Spanish 47.3% and the Virginia 43.7%. For instance, in Tennessee 93% of the Peanuts grown are the Virginia variety, and 1% Spanish, whereas in Texas 1% is Virginia and 97% Spanish.

Peanut Oil

Spanish Peanuts are about half oil, and the modern presses extract about 44% of this. Cleaned farmers' stock peanuts, (shells included) will yield per ton 500 to 600 pounds of oil, and 1,100 pounds of peanut cake containing about 40% protein, the latter having a food value practically the same as most cotton seed meal. One ton of Spanish peanuts yields from 71 to 84 gallons of oil worth (in Jan. 1918) $1.50 to $2.00 per gallon, retail. In Texas, the yield of oil was only about 68 to 70 gallons per ton in 1917.

It is the experience of many farmers that the hay resulting from an acre of peanuts will pay for the cost of production of the crop, leaving the peanuts a clear profit.

List of Crops and Subjects Covered in Free V-C Crop Books

EVERY land owner and farmer will find these illustrated Free Crop Books of intense practical value, for they point the way to greater Prosperity on the farm, which means "increased yields per acre" and *better* crops.

The following list of Crops and Subjects shows how extensively these Books cover every crop that may be profitably grown in the South. If you are interested in one or more of these, fill out the Free Coupon on the opposite page:

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Apples
Apricots
Artichokes
Asparagus
Barley
Beans
Beets
Berries
Blackberries
Cabbage
Canteloupe
Carrots
Cashaw
Cauliflower
Celery
Cherries
Citrus Fruits
Clover
Collard
Corn (Fodder)
Corn (Green)
Cotton
Cowpeas
Cucumbers
Dasheen
Dewberries
Egg Plant
Fertilizers
Florida Crops
Florida Soils
Flowers
Frames (truckin)
Frames (cold)
Fruits
Garlic
Golf Links
Grape Fruit
Grapes
Grasses (Fodder)
Grasses (Lawn)
Green Corn
Hay
Hot Beds
Irish Potatoes
Kumquats
Lawns
Leeks
Lemons
Limes
Lettuce
Melons
Millet
Mustard
Nectarines
Nuts
Oats
Okra
Onions
Oranges
Orchards
Parsley
Parsnips
Peaches
Peanuts
Pears
Peas
Pecans
Peppers
Pineapples
Plums
Potatoes (Irish)
Potatoes (Sweet)
Pumpkins
Radishes
Raspberries
Rice
Rye
Shallot
Shrubs
Snap Beans
Sorghum
Soy Beans
Spinach
Squashes
Strawberries
Sugar Cane
Sweet Corn
Sweet Potatoes
Tangerines
Tobacco
Tomatoes
Trees (Fruit)
Trees (Shade)
Trucks
Turnips
Vegetables
Watermelons
Wheat

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of our valuable Crop Books, for they are as free as the air you breathe to all owners and tillers of Farms. Your Farming Friends will appreciate your being the means of their getting these books. Please write their names and addresses below and we will send Books free by next mail, no obligation on your or their part. Why not DO IT NOW?

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FREE V-C CROP BOOK COUPON

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GENTLEMEN:

I will appreciate your sending free of all cost or obligations some of your Crop Books to those whose names and addresses appear below.

My Name is ....

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4 My Friend's Name ....

My Friend's Address .... City and State ....

5 My Friend's Name ....

My Friend's Address .... City and State ....

50 PER CENT. BETTER RESULTS:
"We received a ton of V-C Plaster this season which we divided among six of our customers (Peanut Growers). They tried V-C side by side with other plaster, and some others used it side by side where there was no plaster used, and where V-C was used they made 50 per cent. more solid Peanuts. We therefore recommend its use as a top dressing for Peanuts."
C. HARRELL & SON, Burgaw, N. C.

ENTIRELY SATISFIED—WILL USE V-C AGAIN:
"Results obtained from use of the V-C Plaster gave me the best crop of Peanuts I have ever raised. Am entirely satisfied with V-C and expect to use it again. I think the Phosphoric Acid in it is very beneficial to the Peanut Crop." C. L. BERGEN, Smithfield, Va.

SOMETHING IN IT INCREASES GROWTH OF VINES:
"The results I got from the use of the V-C Plaster I bought of you last year were entirely satisfactory. I saw this difference, that the growth of vines was a little better where I used V-C than where I used other plaster. I think there is something in it that will increase the growth of the vines. Expect to use V-C again next year if I can get it.
M. L. NILIUS, Isle of Wight, Va.

V-C PLASTER MAKES GOOD, HARD PEANUTS:
"The V-C Plaster I bought of you the past season, I used on land that had always made pops previously, and now I made good, hard Peanuts, and am entirely satisfied with the results. Expect to use V-C again next year." J. C. ASHBY, Carrollton, Va.

BEST RESULTS EVER:
"It gives me pleasure to advise you that I used V-C Plaster this year, and the results were gratifying. I had two of my tenants use the same, and the results were better than from any other plaster they had ever used." JOHN S. GALE, JR., Ivor, Va.

V-C SATISFACTORY IN EVERY RESPECT:
"One thing was especially noticeable and that was that V-C Plaster kept the vines growing longer and greener than other plasters. I also had some used on two farms I own, and the results were satisfactory in every respect. This section was very dry in September—having scarcely any rain between the first of September and the first of October—which gave a conclusive test of the efficiency of V-C Plaster. L. J. BAIN, Capron, Va.

V-C BEST FOR ALL CROPS:
"On a 90 acre patch of White Spanish Peanuts I got a yield of 80 bushels to the acre of very fine Peanuts. This patch was planted June 20th, after oats, and fertilized with V-C. The reason I have used V-C Fertilizer on all my crops the past 12 years is because I find them better than any other for producing excellent crops. Have never found any fertilizer that can come up to V-C."
DR. W. R. TERRY, Shellman, Georgia.

CROP EXCELS IN QUALITY AND QUANTITY:
"I have used V-C Phospho Plaster on my Peanuts by the side of other plaster. The Peanuts I used V-C Plaster on kept greener through the months of August and September. I shocked them different, in digging, intending when I pick them to compare difference. This I have not yet done, but am satisfied that the quality and quantity on the land on which I used V-C Plaster will excel the Peanuts where other plaster was used." A. P. PULLEY, Ivor, Va.

V-C GREATLY INCREASES GROWTH OF VINE:
"V-C bought of you in the summer is the best I ever used. It not only makes Peanuts hard, but greatly increases growth of the vines. Shall want it again.
W. F. PORTER, Isle of Wight, Va.

RESULTS FAVOR V-C PLASTER:
"I have used V-C Plaster by the side of other plaster, and the results in favor of the plaster from the Virginia-Carolina Chemical Co. were that the Peanuts were heavier and more well-filled to the vine." W. A. BELL, Wakefield, Va.

GIVES V-C THE PREFERENCE:
"The V-C Plaster was very satisfactory. We could note a difference in the size of the vine, and the Peanuts show up better hulls. We give V-C the preference over the plaster that we have used heretofore, and which was used by the side of V-C Phospho Plaster this year."
T. O. GWALTNEY, Wakefield, Va.

HELPED HIS YIELD:
"This is the test of V-C Peanut guano. Guano put around Peanuts on one acre, gathered 489 pounds. One acre without, 446 pounds, Guano put under peanuts when planted, 404 pounds. No Guano, 318 pounds. This is a test on four acres. The guano being put out just as the heavy rains started we don't think this a fair test." LEE & THORNTON, R. F. D. No. 5, Dawson, Ga.

What Users of V-C Fertilizers Say

GOOD RESULTS WHEREVER USED:

"I have used your guano for a number of years with good results. This year am using it on Beans, Cucumbers and Tomatoes. Also am using other brands of guano this year, but am gathering more Cucumbers and Tomatoes where V-C Fertilizer is used. Have used your Fertilizers in Alabama with good results, and equally as well in Florida."

W. L. WARREN, Wauchula, Fla.

CAN'T BE DOWNED:

"Your Fertilizer has been tested on Pine and Hammock lands for various kinds of crops. People have, through prejudice, been trying to down it with other Fertilizers, but the successful results of V-C Fertilizers have blotted out all difficulties, and to make a perfect success they must use V-C Fertilizers."

J. R. WILKERSON, Coleman, Fla.

GRATIFYING RESULTS:

"I have used V-C Fertilizers on my crops this season with the most gratifying results. The plants are well grown, and kept fresh and green all through the dry weather. I am now marketing my Tomatoes. I shall use your guano on my general crops and my Orange Grove."

A. G. MANLEY, Fort Meade, Fla.

GOOD FOR ALL TRUCKERS:

"I have used V-C Fertilizers this season on Tomatoes and Beans, and they are fine. I commend them to all truckers."

V. W. SURRENCY, Bowling Green, Fla.

EXCELLENT RESULTS:

"I have been using V-C Fertilizers on Cucumbers for several years. I make a specialty of Cucumbers and have most excellent results from the use of your goods. I take pleasure in recommending them to all Truckers."

W. H. REVELS, Linden, Fla.

GOOD FOR TRUCKERS:

"I have been using V-C Fertilizer for some time on my Truck farm, and am well pleased with the results. It is all that you claim for it and I can cheerfully commend it to truckers."

J. E. MILLS, Pine Castle, Fla.

RESULTS PLEASING:

"I have used V-C Fertilizer on my Orange Grove, and am well pleased with the results."

S. L. GRIFFIN, Zolfo, Fla.

USED TEN TIMES AS MUCH:

"I have been using V-C Fertilizer for the last two years. Last June I gave my testimonial as to good results. This year I have used ten times as much as I did last, and am fully satisfied with the results of V-C., and from this I think it will be sensible to continue its use. My Oranges are bright and beautiful."

J. E. GRIFFIN, Lakeland, Fla.

CAN'T BE BEAT:

"I have used V-C Fertilizer under Cabbage, Lettuce and Tomatoes, and am well pleased. I don't think there is any Fertilizer made that can beat it, and I expect to buy more next season."

A. F. CRENSHAW, Coleman, Fla.

NOTHING ELSE FOR HIM:

"I take pleasure in recommending V-C Fertilizers to any one who expects to use Fertilizers, either for Orange Groves or Vegetables. I have been using it for two years on both, and will have nothing else but your brands."

J. P. RICHARDSON, Leesburg, Fla.

BETTER BY A GREAT DEAL:

"I put out two tons of V-C Fertilizer last December, right beside another company's Fertilizer, and yours gave more satisfaction than the other by a great deal. It is the best I have ever used."

ASA BAILLEY, Wauchula, Fla.

These are only a few of the thousands of testimonials received by us

PEANUTS

V-C Increases Business:

"We have been using V-C Fertilizers for several years, and each season our tonnage has increased with fine results. We also want to congratulate the officials of this Company for having such efficient men at the head of their departments, as we have never dealt with any concern where we have been better treated. We are always glad to say a good word in their behalf."

L. J. UPTON & COMPANY, INCORPORATED.
BY L. J. Upton
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Norfolk, Va.

Too Much Cannot Be Said About V-C Quality:

"I have been using and selling V-C Fertilizers for years, and my customers and myself have been well pleased. I own 12 farms, and every renter used V-C this year but one, and he regrets not using it. I feel that too much cannot be said about the quality of your goods."

N. C. Crafton
South Hill, Va.

Why not V-C Now?

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NORTHERN AND WESTERN GROWN

Published by

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RICHMOND, VIRGINIA

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Recommended by

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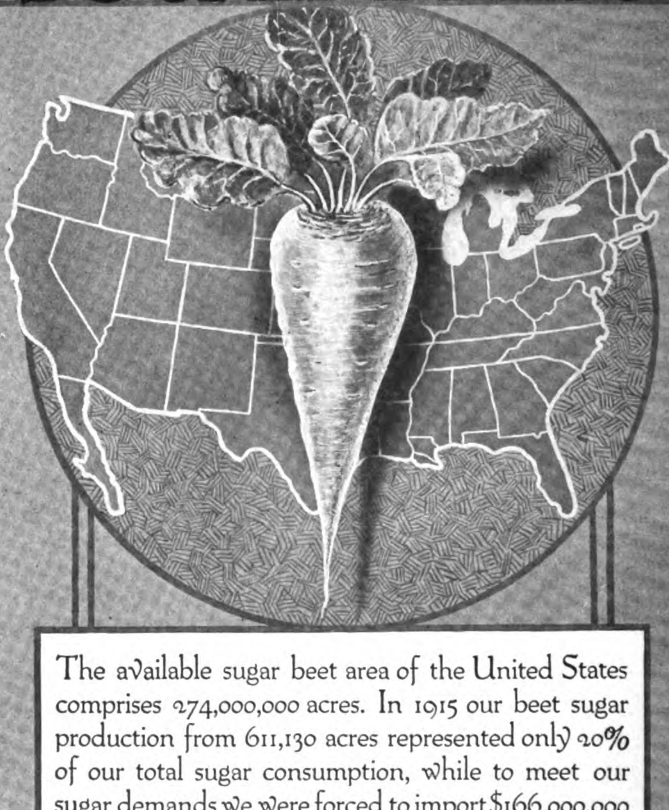
Crop	Sandy Soil APA-A-P	Loam Soil APA-A-P	Clay Soil APA-A-P
Alfalfa, seeded down	10-2-4	12-2-2	12-2-0
Alfalfa, top dressing	12-0-4	12-0-2	16-0-0
Asparagus	7-5-2	7-5-2	7-5-2
Apples, sod orchard	7-5-2	8-6-0	8-6-0
Apples, tilled orchard	10-3-4	10-3-2	12-3-0
Barley	10-2-4	12-2-2	12-2-0
Buckwheat	10-2-4	12-2-2	12-2-0
Brussels Sprouts	10-3-4	10-3-2	12-3-0
Beets	10-3-4	10-3-2	12-3-0
Beans, garden	10-3-4	10-2-4	10-2-4
Beans, field	10-2-4	12-2-2	12-2-0
Blackberries	12-2-2	12-2-2	12-2-2
Corn, for grain	10-2-4	12-2-2	12-2-0
Corn, for silage	10-2-4	12-2-2	12-2-0
Clover, seeding	10-2-4	12-2-2	12-2-0
Clover, top dressing	12-0-4	12-0-2	16-0-0
Cabbage	10-3-4	10-3-2	12-3-0
Cauliflower	10-3-4	10-3-2	12-3-0
Carrots	10-3-4	10-3-2	12-3-0
Cucumbers	10-3-4	10-3-2	12-3-0
Celery	10-3-4	10-3-2	12-3-0
Grass, seeding	10-2-4	12-2-2	12-2-0
Lettuce	10-3-4	10-3-2	12-3-0
Millet	10-2-4	12-2-2	12-2-0
Meadow, top dressing	7-5-2	8-6-0	8-6-0
Mangels	10-3-4	10-3-2	12-3-0
Melons	10-3-4	10-3-2	12-3-0
Oats	10-2-4	12-2-2	12-2-0
Onions	8-2-8	8-2-8	8-2-8
Permanent Pastures, top dressing	12-0-4	12-0-2	16-0-0
Parsnips	10-3-4	10-3-2	12-3-0
Potatoes, late	10-3-4	10-3-2	12-3-0
Peas, field	10-2-4	12-2-2	12-2-0
Peas, garden	10-3-4	10-2-4	10-2-4
Peaches	7-5-2	8-6-0	8-6-0
Rye, fall seeding	10-2-4	12-2-2	12-2-0
Rye, spring top dressing	7-5-2	8-6-0	8-6-0
Rutabagas	10-3-4	10-3-2	12-3-0
Raspberries	12-2-2	12-2-2	12-2-2
Sweet Corn	10-3-4	10-3-2	12-3-0
Sugar Beets	10-3-4	10-3-2	12-3-0
Spinach	7-5-2	7-5-2	7-5-2
Strawberries, spring setting	10-3-4	10-3-2	12-3-0
Strawberries, top dressing	7-5-2	8-6-0	8-6-0
Squash	10-3-4	10-3-2	12-3-0
Timothy, top dressing	7-5-2	8-6-0	8-6-0
Turnips	10-3-4	10-3-2	12-3-0
Tomatoes, cannery	10-2-4	10-2-4	10-2-4
Wheat, fall seeding	10-2-4	12-2-2	12-2-0
Wheat, spring top dressing	7-5-2	8-6-0	8-6-0

SUGAR BEETS



The available sugar beet area of the United States comprises 274,000,000 acres. In 1915 our beet sugar production from 611,130 acres represented only 20% of our total sugar consumption, while to meet our sugar demands we were forced to import $166,000,000 worth of foreign sugar, which could have been produced by us on 1,780,000 acres. The entire gross profits from 10,799,000 acres of wheat were thus absorbed by this importation.

Sugar Beets

NORTHERN AND WESTERN GROWN

VIRGINIA CAROLINA
V-C Fertilizers
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V-C AGRICULTURAL BUREAU.

For the benefit of our customers and friends we have recently established at our Home office at Richmond, Va., an Agricultural Service Bureau. As Director of the Bureau, we have secured Prof. A. E. Grantham, a practical and scientific agronomist who was formerly in charge of the Agronomy Department at the Delaware Agricultural Experiment Station.

This Bureau is maintained to aid farmers in getting better returns from the soil.

If you have any questions concerning the use of fertilizers, the management of soils, or the growing of crops, send us a letter, or postcard, stating your problem, and it will be given prompt attention.

This service is free.

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SUGAR BEETS

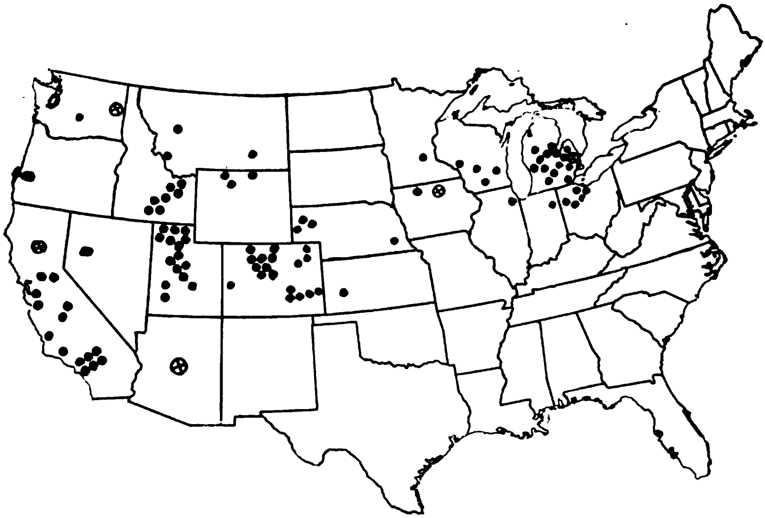
"Sugar has been called crystallized sunshine. It pleases the sweet taste of all mankind and has brought the sunshine of prosperity to all peoples engaged in its production."

The sugar beet is now an important source of our sugar supply. It formerly contained but six per cent of sugar, but it has been improved by selection and cultivation until it now contains thirteen to eighteen per cent of sugar. All the early experimenting necessary firmly to establish a new industry has been done. The future of the industry rests with the American farmer. He must accept or reject the crop on its merits.

Growth of the Sugar Beet Industry

The manufacture of sugar from beets was one of the incidental results of the Napoleonic wars following the French revolution. It had been known for a long time that beets contained sugar but no one seemed to think that it was possible to make sugar from beets, containing 6 per cent sugar, in competition with sugar cane containing 18 per cent sugar. However, the demand of war and the need for sugar to supply the civilian population forced the beet sugar industry into prominence. From that time on the beet sugar industry made steady progress in France, Germany, Austria and other European countries.

Only feeble attempts to grow sugar beets were made in the United States prior to 1880. During the decade 1880 to 1890 a number of factories for making sugar from beets were built but most of them were failures. There were many causes for these failures, the principal ones being poor machinery, inadequate or impure water supply, the poor quality and quantity of beets grown and lack of experience in beet sugar manufacture. But with larger experience, better machinery, and with greater skill in the location of factories and the manufacture of beet sugar six successful factories were in operation in 1891. Three of these were located in California, two in Nebraska and one in Utah. From 1891 until the present time the sugar beet industry of the United States has grown rapidly. In 1918 there were in operation 89 large factories which sliced annually 5,523,036 tons of beets which yielded 765,063 tons of sugar. This growth is indeed almost phenomenal and with the ever increasing need for sugar we may expect a still farther increase in growth in the future.



Outline map of the United States showing beet sugar mills in operation and those standing idle (X) in 1917.

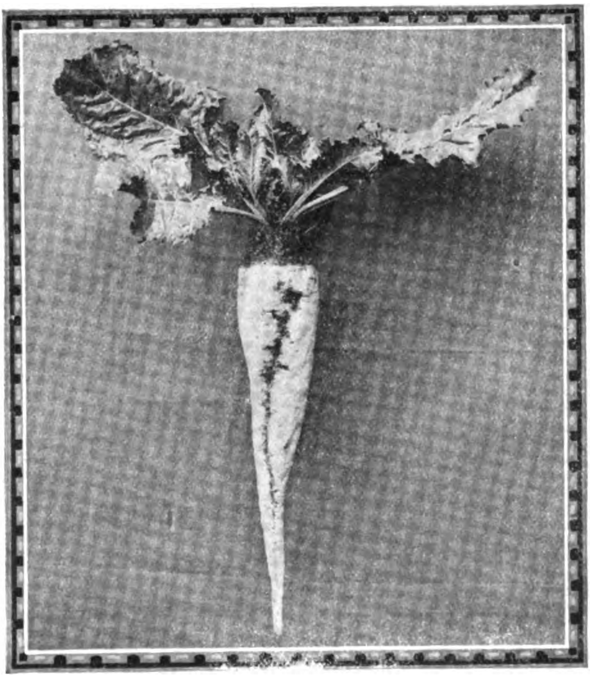
Where Sugar Beets are Grown

Fifty years ago three-fourths of the world's supply of sugar was made from cane, grown principally in the tropical zone. Now more than three-fifths of the total supply of sugar produced is made from beets grown in the colder half of the north temperate zone. This zone embraces large areas of fertile soil that is admirably located and well adapted to beet culture. There is enough soil in this zone in our own country adapted to beet culture to grow several times the amount of sugar now annually consumed in the United States. From the results obtained in European countries it is reasonable to say that all the sugar needed for home consumption could easily be produced without appreciably decreasing the total production of our leading crops.

The Effect of Beet Culture on Soil Fertility

Unlike corn, sugar beet culture does not rapidly decrease soil fertility. A soil would, of course, become depleted by the continuous culture of beets, but when they are grown in a suitable rotation with other crops the yields of other crops are improved. It is an accepted fact that with the introduction of beet culture on European farms, the yields of the other crops grown were materially increased. On this point we quote the following from Bulletin No. 260 of the U. S. Bureau of Plant Industry:

"The high yields which are secured from cereals and other crops in beet localities date from the introduction of rational beet culture, which is therefore the direct and indirect cause of this increase in the gross and net returns of the whole argiculture, and thereby also, in the land values in the above-mentioned localities. Since the introduction of beet culture, despite a reduction in the acreage of grain, the total grain yield has been increased."



A fairly good type of seed beet. The sugar beet is th · most scientifically bred plant in the world. The entire development of the plant is the result of a century's most scientific investigation.

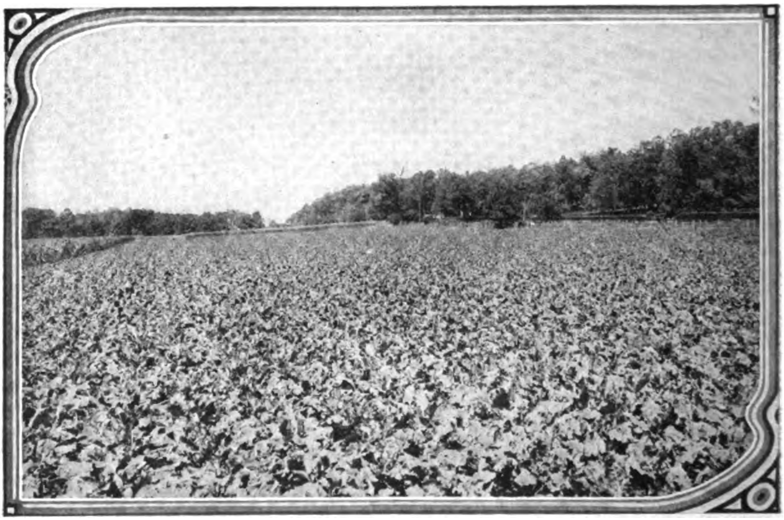
In the United States the yields of other crops following sugar beets have been noticeably better than when they follow grain crops. This may be attributed to the excellent mechanical condition of the soil and to the subsoiling given when the beets are lifted.

Sources of Sugar

For many generations cane was regarded as the only source of sugar. Because it could be grown only in the warmer climes, production was restricted and the price of sugar was high. When the production

of sugar from beets was successfully accomplished and the industry began to grow in prominence and compete with cane sugar the latter industry declined and at the present time only about two-fifths of the world's supply of sugar is made from cane.

Twenty-five to seventy-five years ago maple sugar was used extensively in the northern part of the eastern half of the United States. In fact, it was the principal source of sweets. Hard-wood maples were plentiful, the process of manufacture was simple and inexpensive, and any farmer who wished could tap the trees, obtain the sap and evaporate it. In this way a supply of excellent sugar was easily obtained. But the competition for land and timber has caused most of the maple forests to be cleared. The sugar now used must come from other sources and most of it will be from beets.



The sugar beet is both a money crop and a soil builder when properly grown. One of the secrets of successful beet culture is the application of fertilizer, which will force the growth and mature the crop early.

The Factory and the Farmer

Sugar beets can not be profitably grown except in localities where there is a properly equipped factory for the manufacture of beet sugar. The cost of building, equipping and running such a factory is large. Small factories, poorly equipped and requiring considerable hand labor cannot be profitably run. A successful factory must be completely equipped with the best modern labor-saving machinery and growers should remember that this large equipment must stand idle for eight months of the year. During this time interest and depreciation charges continue and the owners must have sufficient returns to pay this expense.

In order that a factory may be run successfully it must have an abundant supply of beets. These must be contracted for so that the operators may know what to depend upon. The beets must be of good quality and rich in sugar so that a profit may be realized on the manufacturing process. The farmer should realize these facts when he has a notion that the manufacturers are getting all the profit.

The outlook for the farmer must be promising or he will not cut the acreage of well-tried crops to grow sugar beets. The farmer must be reasonably sure that the crop may be made successful and profitably in his section and that there will be a ready cash market for the beets. The farmer must also live within a reasonable haul of the factory or a railroad station from which the beets may be shipped. Without these assurances he is not likely to undertake sugar beet culture. For these reasons the factory owners should realize, and usually do, that it is to their interest to pay the farmers as much as possible for the beets grown. Neither the factory operators nor the farmer can succeed alone. Therefore, the profits should be equally shared by both.

A splendid stand of sugar beets. There are very few farm crops that will respond more profitably to fertilization. Be assured of the best returns per dollar invested by using V-C on your sugar beets.

Returns from Beets

The gross returns secured per acre from beets, like those from other crops, depend very largely upon the kind of soil, its productiveness and to the degree of skill exercised in growing the crop. The yield per acre usually ranges between 8 and 18 tons per acre, which at pre-war prices would give the farmer a return of $40 to $80 per acre. At present prices (1918) the returns would be $82 to $180 per acre. Before the war many farmers secured a return of $50 to $60 per acre. The average ranged from $50 to $70 per acre and a return of $70 to $100 was not uncommon among good growers who have suitable soil.

A. Preparing land for sugar beets by plowing under cover crop
B. Wooden float used in leveling seed bed before planting.
C. The corrugated roller, an implement which breaks the crust, pulverizes the soil and ridges the ground against wind effect.

Cost of Production

The cost of producing sugar beets varies greatly. It depends upon the kind of soil, the amount of weeds that must be removed, the season, the kind and efficiency of the implements used, and the cost of labor and fertilizers. As a rule the contracting sugar company furnishes all the hand labor necessary for blocking, thinning, lifting and topping for $25 to $31 per acre. When beets sold for $9 per ton the price charged for hand labor was $25 per acre. On the average the total cost of production, harvesting and marketing should range between $30 and $50 an acre, or around two-thirds of the gross returns per acre. On many good beet farms the total cost of production is not much more than one-half the gross returns.

The smooth roller a useful implement in packing the seedbed firmly before and after planting.

Climatic Conditions

One of the principal reasons for many of the early failures in beet culture was due to a lack of knowledge regarding the climatic conditions suitable for success. Beets were frequently planted in sections where the average summer temperature was too high for the development of sugar beets of good quality. Careful investigations made in the United States and in European countries reveal the fact that beets do best 100 miles north or south of where the average summer temperature is 70° F. It is also highly desirable that the moisture be well distributed and plentiful. The rainfall should average about two inches per month. Beets do better when the largest amount of rainfall comes during July and August followed by a low precipitation in September and October. Dry weather during the latter months is very essential to the proper maturity and ripening of the beets, just as a rather heavy rainfall during July and August is essential to rapid growth and large yield.

Soil Requirements

Like most other crops sugar beets do poorly on wet, undrained soils. On account of the natural deep rooting habit of the plant, open loam soils are most desirable. Fertile, well drained sandy loam soils are also well adapted to beet culture. Heavy, tight clays and soils underlaid with hard-pan are not suited to beet culture; neither are light sandy and muck soils.

Good soil aeration is a prime requisite for successful beet culture. In many cases aeration can be greatly improved by tile drainage. Subsoiling also improves the aeration of soils having a rather heavy subsoil. Probably the chief way of improving aeration is to keep the soil well supplied with organic matter. However, for the production of beets, the organic matter should have passed through the active stages of decay before the beets are planted. Vegetable manures should

Planting sugar beet seed with four-tow drills whereby the seed should be placed at a uniform depth, in straight rows and in a firm seed bed.

be plowed under six months to one year before the beets are planted. Heavy clover sods and also heavy applications of farm manure should be plowed down and corn or some other tilled crop grown for one year before the soil is planted to beets. This plan gives the vegetable matter time to pass through the active stages of decay and thus provides favorable conditions for the action of commercial fertilizer and for the best growth of the beet crop.

Fall Plowing:

Fall plowing is always best for beets. The vegetable matter turned under begins decaying, the raw subsoil, if any is turned up, is acted upon by freezes and by the air and more moisture is stored in the soil for the succeeding crop. In all cases where stalks or other vegetable matter is to be turned under, it is highly desirable that the land

be fall plowed so the vegetable matter will partially decay before the beet seed is planted. Fall plowing also enables the farmer to more quickly and thoroughly prepare the seed bed in spring. This is an important advantage. Frequently the land can not be plowed in spring and then fitted by the time beets should be planted and as a result the seed bed is frequently not well made. This may result in a poor stand and an unsatisfactory crop. Open, porous soils on which there is little or no vegetation may be plowed in spring. The plowing should be done as early as possible so the seed bed may be well prepared before planting time.

Cultivating beets with a four-row cultivator should be done with the greatest of care lest the beets be damaged and a good stand destroyed.

Finishing the Seed Bed:

The preparation of fall plowed land should begin early in spring. It should be remembered that a thoroughly well prepared seed bed is one of the main points to be considered in successful beet culture. In most cases the soil should be double disked once and frequently twice. That operation should be followed with a spike-tooth harrow one or more times and with a roller if the soil is cloddy or too loose. No amount of work should be spared that is necessary to thoroughly fine and firm the seed bed to full plow depth. As it is very desirable to have the soil in the best possible physical condition, the soil should not be worked when wet. The soil should be open enough to permit air circulation but no large air spaces should be present as they hinder the rise of moisture from the subsoil. The fertilizer should be applied broadcast and worked into the surface soil before or at the time of seeding.

Sugar Beet Seed

In the past, most of the sugar beet seed planted in the United States has been imported from Germany, Russia and France. American growers have thought that they could more profitably import seed than grow it. Late investigations indicate that home-grown seed may be safely relied upon. One of the chief advantages of home-grown seed is that a more definite knowledge can be had as to the quality of the variety or strain of beets planted.

Like any other crop, beets may be greatly improved in quality and yield by selection and breeding. American experiment stations have been doing some work along this line with very encouraging results.

Three types of seed stalks of good yield and quality.

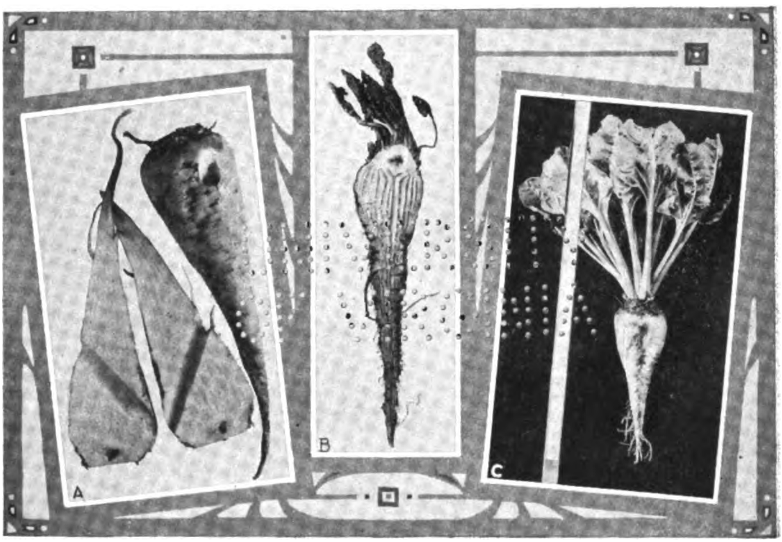
By careful breeding and selection the sugar content of beets has been considerably increased and before many years we may reasonably expect the average production of sugar per acre to be considerably higher than at present.

In most cases the contracting sugar factories furnish beet seed to each grower at a specified price. As the factory is directly interested in getting a large yield of high quality beets, the best seed obtainable is usually secured. This plan will doubtless be continued until the home production of seed is greatly increased.

Planting Beets

A large acreage of beets should not be planted at one time. Unless labor is especially abundant, 15 acres should be about the maximum amount planted at once. On farms where 30 or more acres are planted it is advisable to plant one-third or one-half of the crop at a time. In this way the work of thinning and blocking will be distributed over a longer period. It will also give a longer harvest season, which is desirable.

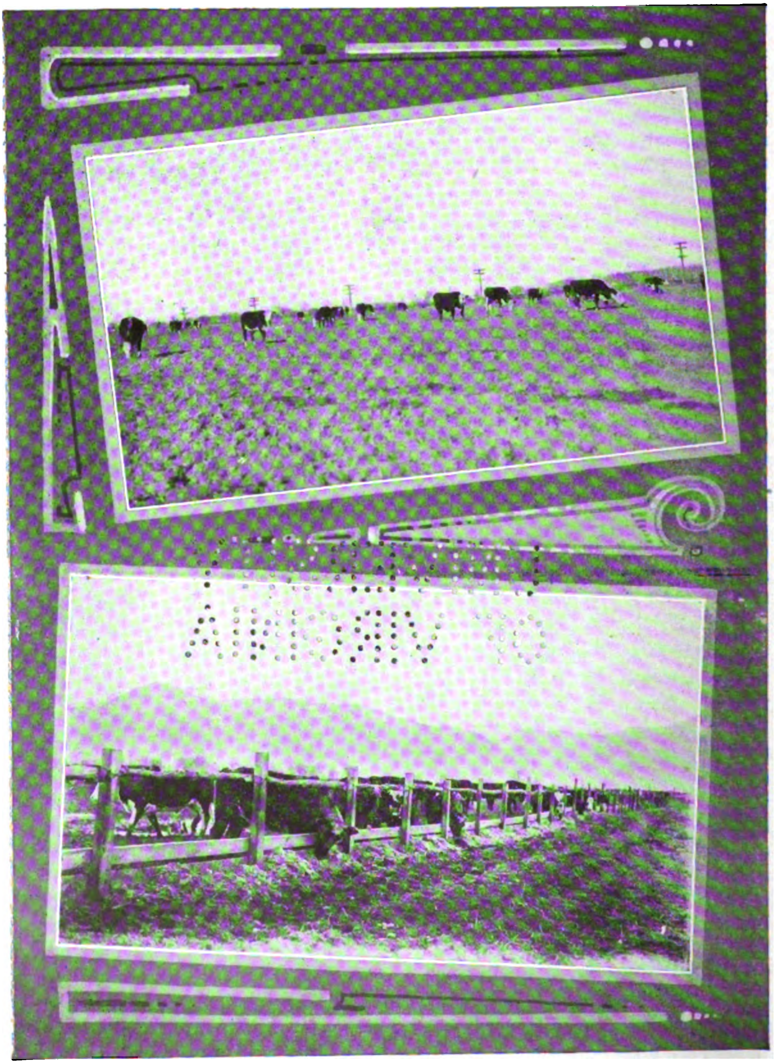
The first planting usually may be made May 1 to 15 and planting should be finished in most sections by June 10. The planting time will necessarily vary somewhat from year to year because of seasonal variations.



A. Method of taking sample of sugar beet in testing for sugar content.
B. Longitudinal section of sugar beet about 4 months old affected with curly-top.
C. A healthy sugar beet four months old.

Amount of Seed:

In most instances 14 to 20 pounds of seed should be sown per acre. When using a small garden drill 10 to 12 pounds will be sufficient. This amount is also considered sufficient when soil and moisture conditions are very favorable and the beet seed is known to be good. It is always advisable to use sufficient seed to secure a good stand under normal conditions.



Pasturing beet tops after roots have been hauled away to factory.
Feeding beet tops in racks, a less wasteful method than pasturing.

Method of Planting:

A good beet drill is a very essential implement. For planting 4 to 5 acres a small garden drill may be used, but planting with it is too expensive for larger areas. There are several good beet drills on the market that may be adjusted to make the rows 18 to 24 inches apart. A special beet attachment made for ordinary grain drills gives very satisfactory results and is more economical where only a small acreage of beets is planted.

All of the drill shoes should be set to plant at the same depth so the seed will germinate and come up uniformly.

Distance Between Rows:

There is considerable difference of opinion among beet growers as to the most desirable distance to make the rows. Generally speaking, the rows should be 18 to 24 inches apart. On rather thin soil, especially on soil deficient in moisture during short dry spells it is better to make the rows 24 inches apart. On fertile soil that has good moisture retaining capacity the rows should be about 22 inches apart. This distance will usually give more crop than 24 inch rows to more than justify the added expense of cultivating.

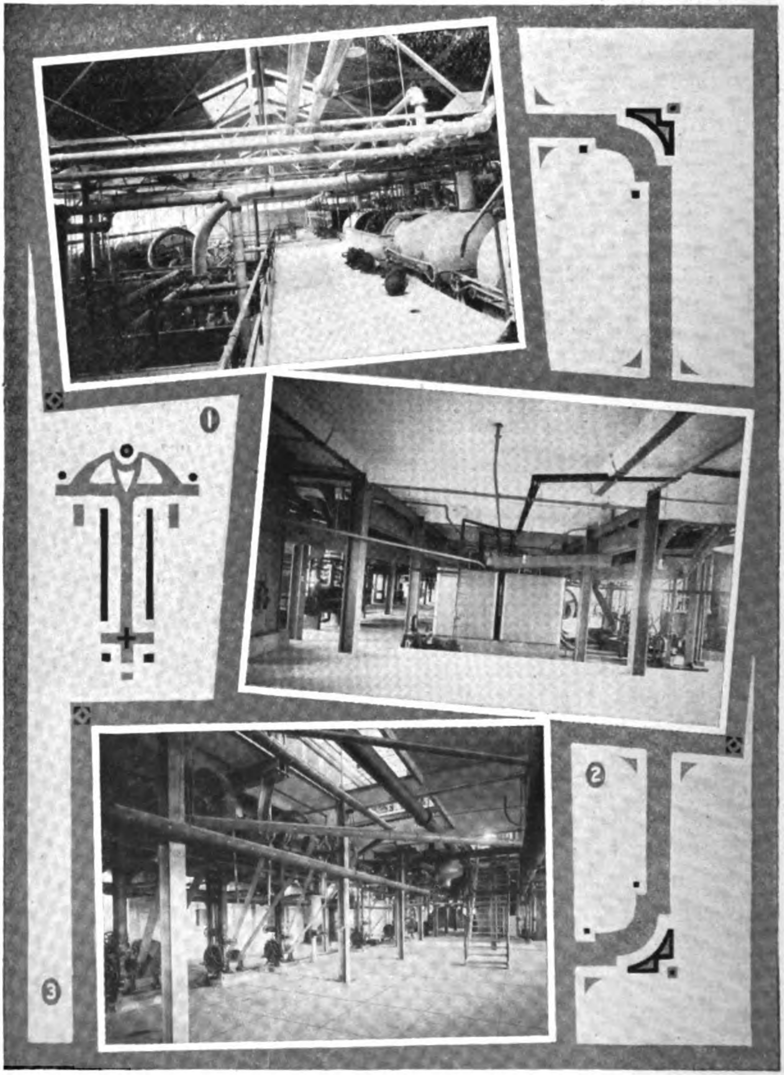
The seed should be planted ½ to 1½ inches deep. In the early season ½ inch deep is sufficient except on very sandy soil. The seed should be planted deeper on light soils than on heavy. In loose open soil they should be planted deep enough to insure good germination. By having the seed bed thoroughly fined and well firmed, especially where the soil is open, much better germination may be obtained. If the soil becomes crusty or dry, germination may be improved by rolling.

Cultivation

In order that the young plants may start growth early, cultivation should begin as soon as the plants are up well enough to enable one to see the rows plainly. The two-row walking cultivator and the four-row riding cultivators are both used extensively for cultivating beets. Either will give very satisfactory results when used by an intelligent, painstaking worker. Special care should be taken to avoid plowing up parts of rows as a gap here and there considerably decreases the yield.

Air, moisture and available plant food is the crop's trinity. All are essential, and frequent and thorough cultivation has much to do with their presence. Cultivation is also the chief way of keeping down weeds and beets will not thrive unless the weeds are kept down. For this reason the crop should be cultivated after each rain or once every ten days and continued until the beets cannot be cultivated without breaking many leaves. Frequently cultivation is stopped two weeks earlier than it should be.

No definite method of cultivating can be given as it depends on the soil and the season. Good judgment should be exercised at all times in the selection of the implement and in equipping it so that the best possible results may be obtained.



1. In these filters a great amount of the impurities in the sugar juice is removed.
2. Cleanliness, good ventilation, ample illumination and up-to-date safety appliances make working conditions ideal.
3. Pumps, piping system and power transmission are clearly shown in this view.

Blocking and Thinning:

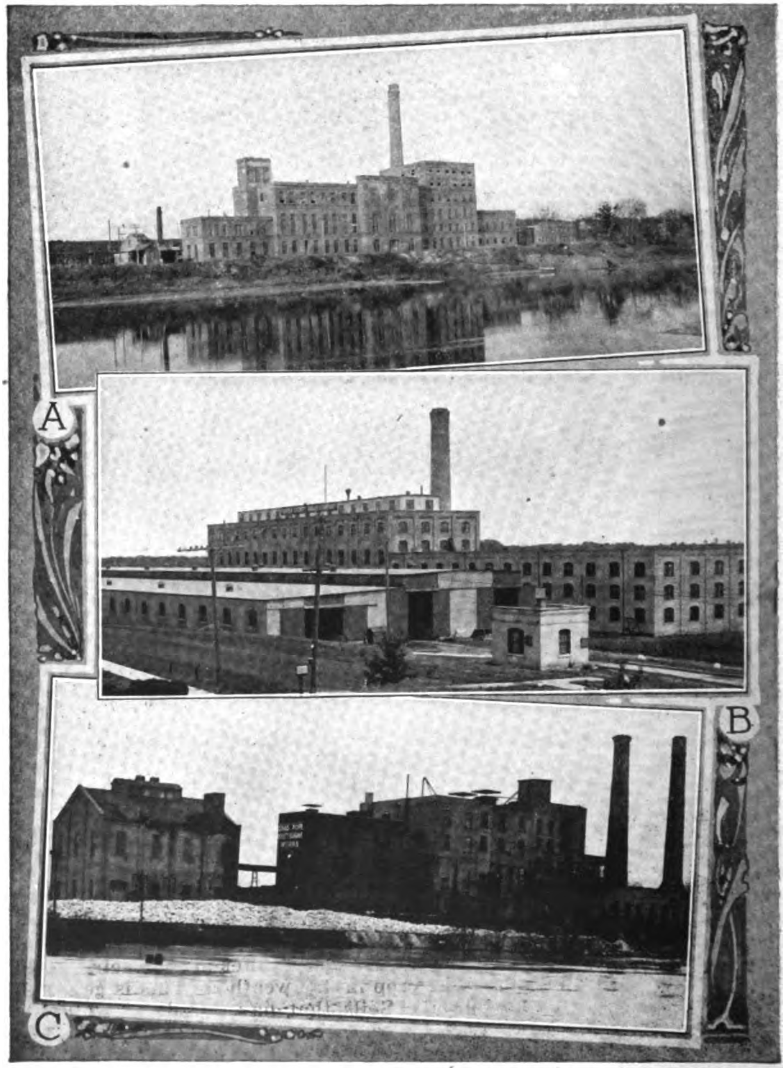
Just as soon as the plants develop the 4th leaf they should be blocked and thinned. This work is frequently delayed for one or two weeks, but not without loss. The plants are taking soluble plant food and moisture from the soil and the less competition each plant has the faster it will grow. For this reason it is important to block and thin early.

Blocking consists in cutting out at right angle blocks in each row and leaving tufts of beet plants to be thinned by hand. This cutting should be made deep enough to kill the plants which are cut out. There is considerable difference of opinion as to the proper distance to leave the plants in the row. It is evident that the plants can not all be left the same distance apart because of variation in the stand and in the

Blocking and thinning sugar beets, an operation which must be performed by hand as soon as the beets show the fourth leaf. This is a very important step in beet culture and any delay will result in diminished yield.

growth of the plants. Some growers prefer to have the plants stand 12 to 16 inches and others 8 to 12 inches. As a rule, when the rows are rather wide apart the beets may be left somewhat closer together in the row than when the rows are narrow. The distance between rows and also between plants in the row should be governed to a large extent by the productiveness of the soil and by its moisture holding capacity. Soils of like character frequently are very different in their ability to furnish moisture to a growing crop in dry weather. This is generally due to differences in the subsoil. Soils that have a subsoil which retains moisture well are much more satisfactory for beets than soil underlaid with a gravelly subsoil.

If the soil is fertile and stands drought well and the crop has been well fertilized the beets may safely be left 8 to 12 inches apart in the row. On sandy soils and soils which do not stand drought so well it is better to leave them 12 to 16 inches apart. On such soils the rows should also be reasonably wide—22 to 24 inches.



A. Chippewa Sugar Co., Chippewa Falls, Wisconsin.
B. Minnesota Sugar Co., Chaska, Minnesota.
C. Charles Pope Beet Sugar Works, Riverdale, Illinois.

When blocking, care should be taken to leave a bunch of good, strong plants in each tuft. Then, when thinning, the largest plant should be left. This point needs to be watched as it is easier to pull the large than the small plants. Some dirt should be brought up around the plant which is left to keep it from falling over.

Crop Rotation

The continuous culture of beets is very undesirable. Beets grow best in a well planned rotation which includes a small grain crop, a clover crop and one tilled crop beside beets. Rotation of crops is always important, but it is more essential in successful beet culture than in the culture of most other crops. It is seldom if ever advisable to grow beets two years in succession. The second crop of beets on the same land is seldom as good as the first under favorable seasoned conditions.

Beets are not hard on the soil, but they must have at their disposal a large supply of soluble plant food. Much of this can be supplied in fertilizer, but it is also important that a heavy growth of clover be plowed under occasionally unless heavy applications of farm manure are substituted. Either of these will not only add plant food but a large supply of decomposable organic matter which is essential to a good physical condition and a fertile soil. Nothing is more important in soil fertility, because bacterial activity, the amount of soluble plant food and the moisture content of the soil depend directly upon the amount of decomposable organic matter present. An abundant supply of organic matter also greatly improves the mechanical condition by making tight, heavy soils more open and porous, and sandy soils more retentative of moisture.

A well aerated soil is one of the most essential requirements for successful beet culture. A soil must have good air circulation in order that it may contain an abundance of readily soluble plant food. Tightly compacted soils are in poor physical condition and never produce good crops. Such soils are not suited to beet culture until the physical condition has been greatly improved by turning under manure, clover or some other crop. There are, however, few soils that will not produce good beets when properly treated for a few years. Generally speaking, it is more profitable to give such soils good treatment for a few years before attempting to grow beets than to attempt beet culture before the soil is put in proper condition.

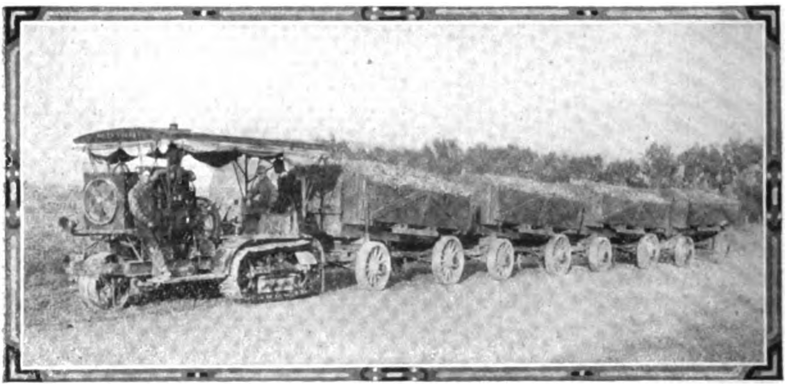
Corn and potatoes are the two crops which most generally precede beets. Both crops are given clean culture and consequently troublesome weeds are greatly reduced and the soil is put in better condition for successful beet culture. Where special care has been taken to keep down weeds a clover sod turned under in early fall may be planted to beets the following year. If corn, potatoes or some other tilled crop precedes the beets the clover may be plowed down in fall or spring as may be most convenient. The important thing is to get the crop turned under a sufficient time to permit the vegetable matter to pass through the active stages of decay before the beets are planted.

An abundant supply of vegetable matter is very desirable but a large supply of rapidly decaying vegetable matter causes beets to grow

coarse and to contain less sugar than when grown under proper soil conditions and well fertilized. In all cases the tilled crop preceding beets should be given thorough tillage to prevent weeds from going to seed so the beet crop may be as free from weeds as possible. Following this method considerably reduces the hand work necessary in beet culture and also increases the yield.

Fertilization

Probably no phase of sugar beet culture has been more neglected than fertilization. As a general rule, representatives of the sugar factory supervise the growing of the crop and for one reason or another have failed to emphasize the importance of fertilizing the crop well. Within the last few years, however, factory managers have learned that thorough fertilization not only gives them a larger crop of beets to

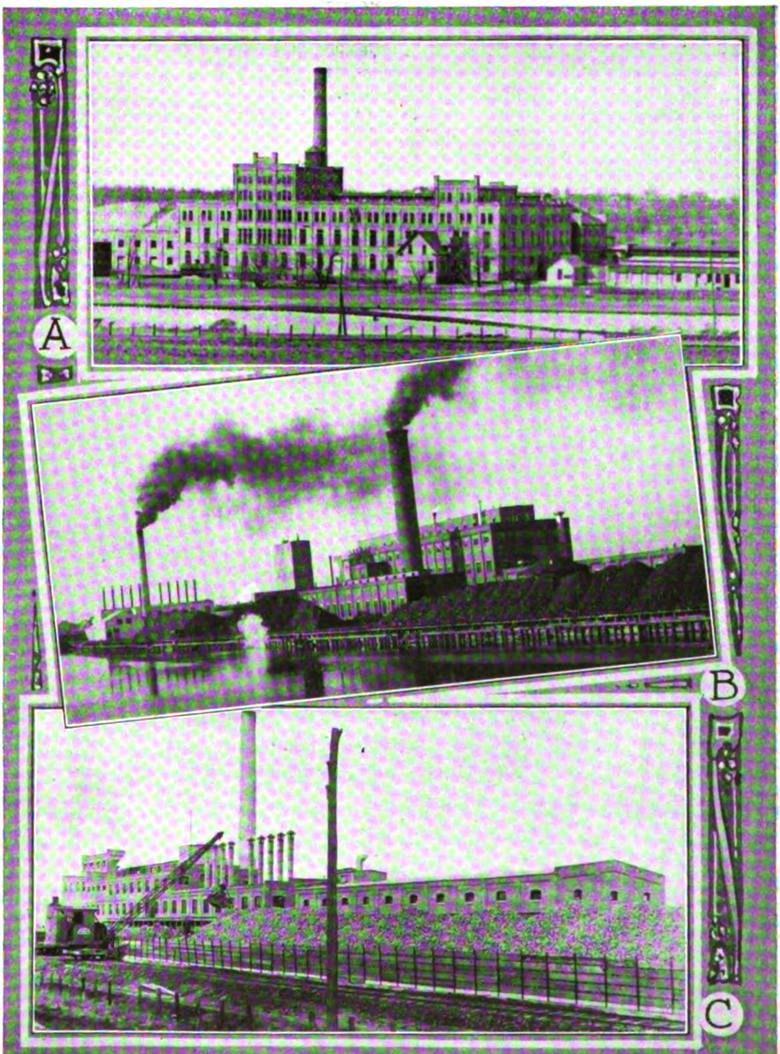


Good roads are a big factor in moving the sugar beets from the field to the mill or to the receiving stations. Modern hauling machinery, as shown above, will greatly lower the cost of hauling and increase the amount which can be hauled at one time.

handle but also improves the quality and the sugar content of the beets. This knowledge has caused them to emphasize the importance of fertilization more strongly.

All of the most successful beet growers use fertilizer. Few farm crops will respond more profitably to fertilization. Beets are not hard on the soil, when the tops are left in the field, but they require plant foods in a readily available form. In this respect they are unlike the clovers and some other crops. They have little or no ability to forage and consume the unavailable plant foods in the soil.

Numerous fertilizer experiments conducted in Michigan, New York and other states show that a complete fertilizer gives the largest yield and is more profitable than special fertilizers carrying only one or two of the essential plant foods. Turning under clover or farm manure for the crop preceding beets reduces but does not eliminate the need for nitrogen. The mineral elements, phosphoric acid and potash, may nearly always be applied with much profit.



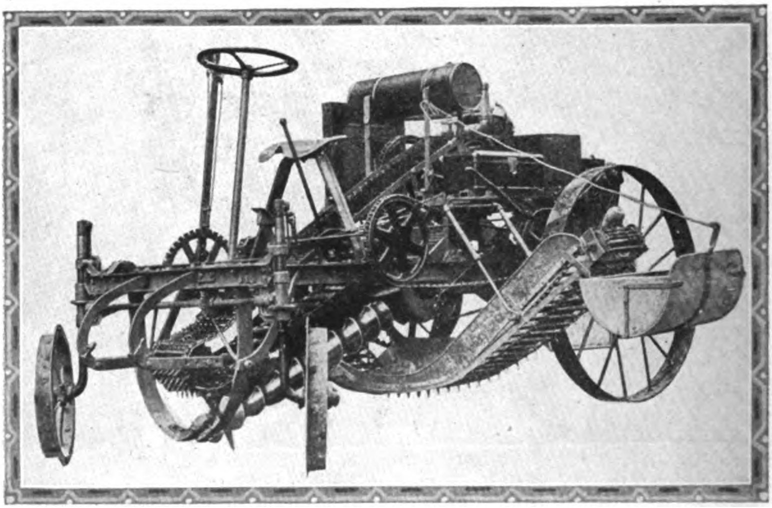
A. Rock County Sugar Co., Janesville, Wisconsin.
B. Menominee River Sugar Co., Menominee, Michigan.
C. Holland-St. Louis Sugar Co., Decatur, Indiana.

What Fertilizers Do

A well balanced fertilizer starts the young plants to growing more quickly, hastens maturity and increases the yield and the sugar content. An unbalanced fertilizer may do some of these things, but not all. For this reason, a fertilizer containing nitrogen, phosphoric acid and potash is most desirable.

Nitrogen:

This plant food is used most largely in the vegetative growth of the plant. Large leaf growth of sugar beets is very desirable on account of the close relation of root growth to leaf growth. Large leaves mean big beets, other conditions being favorable. Nitrogen is also valuable for its stimulating effect on the young plants, its close association with



Type of motor driven sugar beet harvester which is meeting with high favor throughout the sugar beet growing territory.

potash and phosphoric acid in tuber or root formation and the increased yield which it gives. In beet culture it is not desirable to have an excess of nitrogen present in the soil late in the season. For this reason fresh farm manures are undesirable.

Phosphoric Acid:

Most soils are not well supplied with this element, consequently it should always be supplied in the beet fertilizer. It aids greatly in the formation of the beets, increases bacterial activity, aids in the transportation of starch and the formation of sugar and materially increases the yield. No plant food is more essential nor more valuable in a fertilizer for beets.

Potash:

Potash is used in the formation of cell walls and extensively in the formation and transfer of starch. In this way it aids materially in sugar formation and thus helps to increase the sugar content of beets. It is also of much value in increasing yields, especially on sandy loam and black sandy soils. Muriate of potash should be avoided as it is harmful to sugar content of beet.

Lifting the beets with an implement. The first operation in harvesting the crop by hand.

Fertilizer Requirements

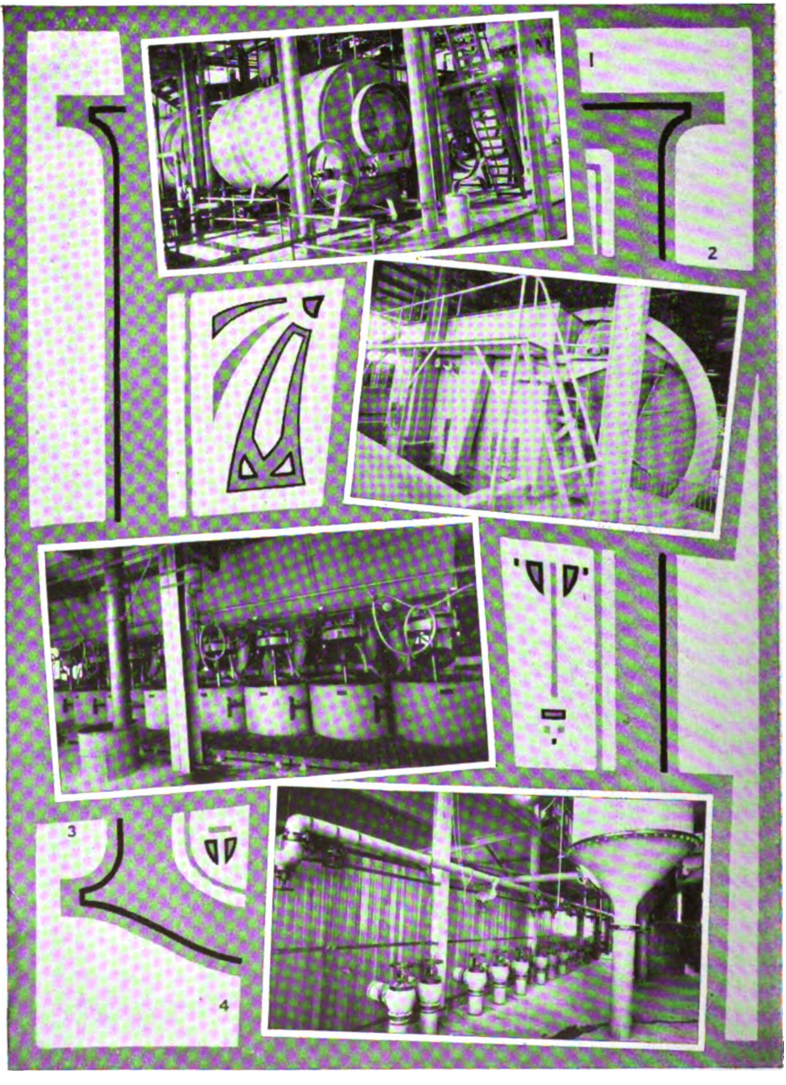
The average yield of sugar beets is around 10 tons per acre. On many farms the average yield is much higher—15 tons or more per acre.

Ten tons of beets with their tops. The tops from ten tons of beets take from the soil

29.8 pounds of nitrogen,
14.2 pounds of phosphoric acid,
71.2 pounds of potash.

The proportion present in the roots and tops vary with the soil, the season, maturity of the crop at harvest and with the variety. Under average conditions there would be hauled away from the farm in ten tons of topped beets approximately

35 pounds of nitrogen,
18 pounds of phosphoric acid,
66 pounds of potash,



1. The crystalizers carry the process of crystallization as far as it will go. From these machines the syrup goes to the centrifugal machines where all the syrup possible is removed. The remaining syrup is waste and constitutes one of the greatest losses in the entire process of sugar making.
2. In this machine the beets are washed with warm water, and all dirt and other foreign matter removed.
3. The syrup is led into these centrifugal machines from the vacuum pan. The machine revolves very rapidly and throws off all the syrup, leaving the white crystals of sugar.
4. Tanks where syrup is stored.

and the plant foods in the tops would remain on the farm. It may not be advisable (experiments show that it isn't) to apply as much nitrogen and potash as is removed by the crop, but it pays to add more phosphoric acid. A good beet fertilizer should contain 2 to 3 per cent of nitrogen, 6 to 10 per cent of phosphoric acid and 3 to 8 per cent of potash. An application of 2-10-3 being the ideal proportions, 200 to 600 pounds of V-C fertilizers of the above analysis will frequently give a return of two to four times its cost. When fertilizer pays such handsome returns no sugar beet grower can afford not to use it.

How to Apply Fertilizer

It is usually best to apply not less than 200 pounds of fertilizer to the acre just before or at the time of planting. It may be spread with fertilizer attachment of beet drill or grain drill, or with special fertilizer or lime distributors. On a small acreage the fertilizer may be broadcasted by hand.

When to Apply Fertilizer

At least two-thirds of the fertilizer used should be applied before or at the time of planting the seed. On sandy soils it may be advisable to apply 200 to 400 pounds before planting and then make a second application two to four weeks after the beets are thinned. This should be put on with a lime or fertilizer sower or with cultivator having fertilizer attachment. A good cultivation should follow the application.

Seed Bed Preparation

Beets require a deep, thoroughly pulverized seed bed. Poor results may be expected from land plowed shallow and not well pulverized. In its early stages of growth the beet plant is weak and will not thrive among clods. It grows well only in soil that has been thoroughly fined and in which there is an abundant supply of available plant food. For this reason good fertilization is very desirable.

Subsoiling:

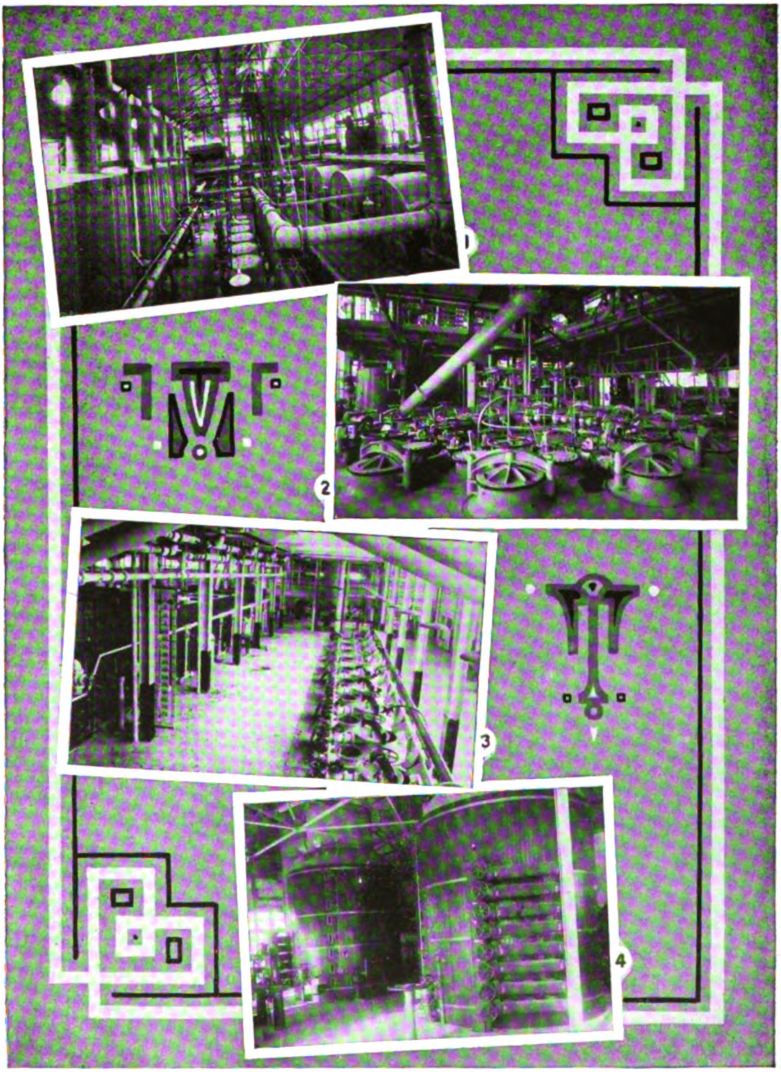
Beet roots do not develop properly when the soil, at a depth of 8 inches, is tight and stiff. Such soil should be plowed 7 or 8 inches deep and a subsoil plow should follow in the furrow made by the turning plow for the purpose of loosening up the subsoil to a depth of 4 to 6 inches. This plow loosens but does not turn the subsoil and by its use soils having rather heavy subsoils may be put in condition to produce good beets. It is best not to increase the depth of the soil more than 1 inch a year. This work should be done in the fall when the subsoil is sufficiently dry to permit thorough work without injuring the soil. In the spring the subsoil is nearly always too wet to be worked so deeply.

Soil having a moderately open subsoil may not be profitably subsoiled. Good deep plowing will usually be sufficient. In this connection, land which formerly has been plowed only five inches deep should not be plowed eight inches deep unless plowed in the fall and a considerable amount of vegetable matter turned under. Increasing the depth of plowing too much at one time, especially if the plowing is done in spring,

A sugar beet plant that has apparently recovered from an attack of curly-top.

is likely to put the surface soil in a worse condition, as raw subsoil will be put on the surface. Such a condition is very undesirable for a good beet crop.

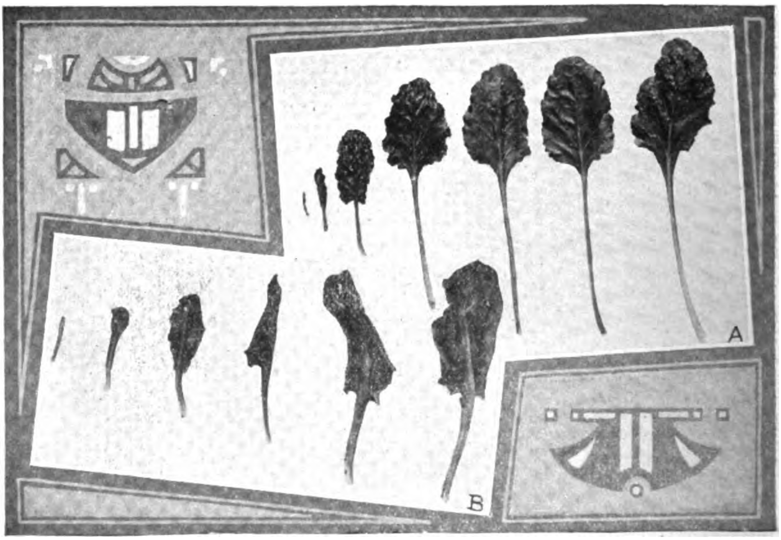
It should be remembered that good well-shaped beets can not be grown in a shallow soil. For this reason all soils that do not have a reasonably open, porous subsoil should receive a good subsoiling so that there will be sufficient loose soil in which the beet roots may develop properly.



1. Carbonators, juice heaters and evaporators. In the carbonators the juice is purified, sterilized and clarified by treating with a solution of milk of lime.
   In the evaporators the juice is gradually thickened from a 10 per cent sugar solution at the start to a 50 per cent solution when the syrup leaves.
2. In these circular diffusion batteries the sugar is drawn from the sliced beets by warm water. When the process is completed the solution is drawn off and the beets removed as a pulp and they are used as a stock feed.
3. Straight line diffusion batteries. The same duty is performed by this type as that mentioned above.
4. In these vacuum pans the first crystalization of the sugar juice takes place and it is one of the most important operations in making the sugar.

Where contract labor is used, the grower will frequently have to watch the blocking and thinning quite closely as the laborers prefer to have the plants as far apart as possible. It takes less work to thin and also to harvest an acre of beets when the plants are far apart. On the other hand the grower must realize that by leaving the beets too thin his tonnage may be cut down and if the beets grow too large and coarse they will contain a smaller percentage of sugar than will medium sized beets weighing one to three pounds.

Special care should be taken to see that the beets are thinned to one plant in a place. When two beets are left together they wind around each other and neither of them will grow well. One good plant in a place is much more desirable and also more profitable.



A. Leaves from a healthy three months old sugar beet plant.
B. Leaves from a three months old sugar beet plant affected with curly top.

Hand Hoeing

About two weeks after the beets are thinned they should be hand hoed and extra care taken to remove any doubles which may have been overlooked in the thinning. This hoeing will usually consist in cutting out the grass and weeds. This work should be done thoroughly as beets will not grow well with weeds. Sometimes one other hoeing will be necessary in order that the weeds may be kept out. Thorough and frequent cultivation will accomplish more than hand hoeing and if properly done little hoe work will be necessary.

Harvesting Beets

Sugar beets are ready to harvest when they show a much lighter or yellowish shade of green and the leaves cease to be crisp. Another

good indication of ripeness is when they are pulled the small fibrous roots will break off and remain in the soil instead of clinging to the beets.

Time for Harvesting:

It remains to be determined how early it is best to harvest beets in this climate. Experienced growers believe it best not to start harvesting too early. As a rule harvesting will begin the first half of October and should be completed by November 15. If they are piled in the field and well covered with the tops it will be safe to leave them there until Christmas.

Siloing sugar beets will keep them in perfect condition, preventing the alternate freezing and thawing which destroys the beets and results in a dead loss to the grower.

Lifting Beets:

All beet raisers should provide themselves with a good lifter which will cost $7 to $12. It is really a subsoil plow and is frequently a very profitable tool to have on the farm. When lifting the beets one will also be plowing the land for the following crop. This subsoiling has much to do with the increased yield of the next year's crop that invariably occurs under normal conditions. Experimenters who plant only

two or three acres can plow out the beets with an ordinary plow, but it will be much slower and many beets will be broken off. An old plow may be used, if the mould board is removed and the side of the point broken off.

Pulling and Topping

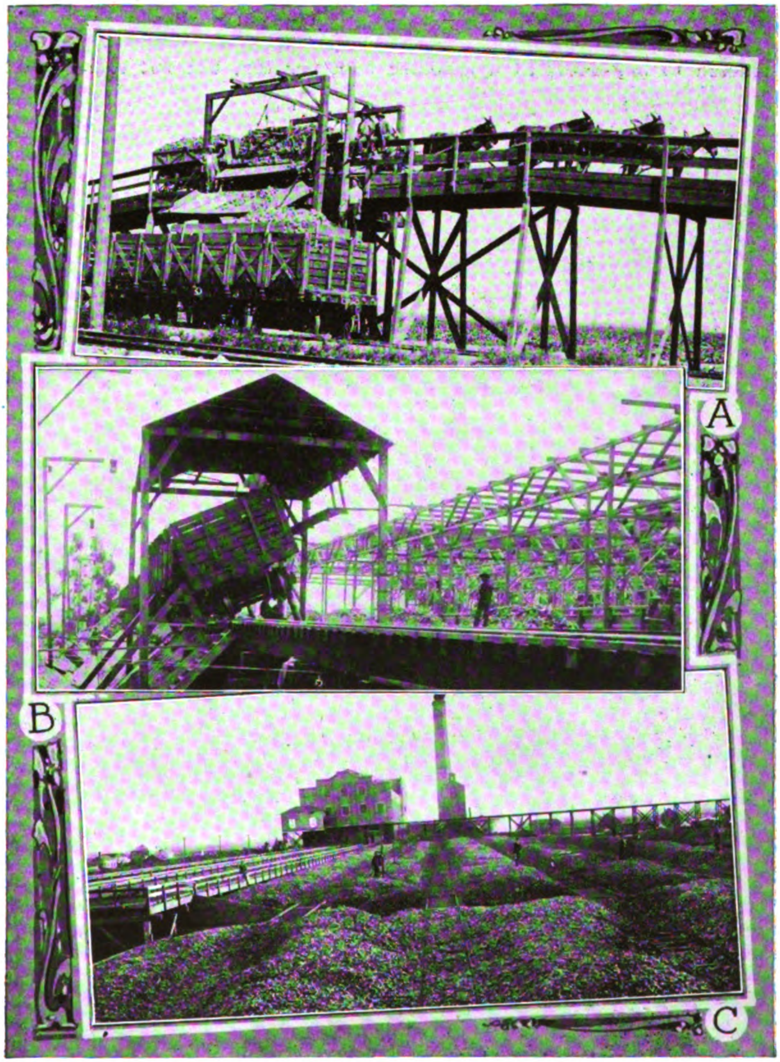
After the beets are loosened or lifted they are pulled by grasping two or three beets in each hand. When lifted they are knocked together to remove the dirt. Care should be taken to see that the beets are knocked together hard enough to remove most of the soil. They are then thrown together in a circular pile allowing sufficient room in the center to pile the beets after the tops are removed. The piles should be about 30 feet apart and 16 to 18 rows should be put together. All rubbish should be removed from the place where the pile is to be made

Taking the tare of the beets. By these tests the average tare is found and on that average the price paid to the farmer is determined. In most cases the farmers have their agents or representatives do this work.

and the ground leveled. See that the beets are well piled and not scattered over more space than necessary. After a set of rows has been pulled the beets should be topped by cutting off the crown of the beet just below the base of the lowest leaves. This is very important, for the crown of the plant contains very little sugar but does contain a large per cent of impurities that are very injurious to the process of sugar extraction. It is very essential that the crown of the plants be well removed. This done, the beets are well sorted from the tops and piled and the pile covered with the beet tops.

Tare

Tare has been the result of considerable controversy between farmers and the factories. Potatoes, grain, hay and most other farm products are brought on the basis of quality. Many farm products



A. Factory receiving station where the beets are loaded for shipment to the factory.
B. Car being dumped at the factory with hydraulic jack.
C. Factory beet bins filled to capacity. The beets are floated into the factory as needed through channels filled with warm water. These channels are beneath the bins.

must be graded before being sold, but this is not possible with sugar beets. However, sugar companies must adopt some method of protecting themselves against the unscrupulous. The sugar company has contracted to buy beets at a specified sum per ton, but not to buy dirt and worthless crowns of plants which should have been removed with the top.

The taking of an average sample from each load, if honestly done, is the only fair and convenient plant yet devised for determining the amount of tare. Any farmer who is dissatisfied with this method may take his own sample, clean and properly top it and determine for himself the amount of tare that should be taken. This is much better than saying the factory people are dishonest when they may be taking less tare than they should. A few determinations carefully made by the grower will often save angry words, hard feelings and a few days of ugly disposition.

Topping sugar beets preparatory to shipping to the factory.

Delivering to the Factory

The factory is usually more anxious to start early than the farmers, but all must be governed by the conditions of the crop. The farmer must also understand that a beet factory, like a canning factory, or a grain elevator, can not take all the year's crop as quickly as it can be delivered. The delivery must be retarded to correspond with the ability of the factory to receive them.

For this reason the total beet crop should not be harvested at one time. It is better to harvest a portion of the crop at a time just as it is advisable to plant only a portion at a time. However, they must all be delivered before the factory closes its season. In most instances the factories have sufficient storage to enable them to receive all the beets two weeks or more before the running season is closed.

Chronology of Sugar

B. C.—Barbarians returning from Rome brought a few beets to Bohemia.

A. D. 625—Crude sugar brought to Turkey by Byzantines after conquest of Persia.

A. D. 755—Spread of sugar is rapid and reaches Spain and Southern Europe about this time.

A. D. 1340-50—Venetian discovers art of refining sugar.

A. D. 1360—50 ton cargo of sugar reaches London. This is the first mention of sugar as a commercial article, it being traded for wool on London market.

A. D. 1360-1600—Due to scarcity and high cost the use of sugar is confined to arts and sciences.

A. D. 1605—Olivier de Serres, the famous French agronomist, becomes convinced that beets contain sugar.

A. D. 1650—Queen Elizabeth of England is the first person to introduce it as an article of diet in the domestic household.

A. D. 1747—Marggraf, the Prussian chemist, in his experiments, obtained sugar crystals from beets.

A. D. 1782—Achard, pupil of Marggraf, with financial support of Frederick the Great, continues field and laboratory experiments of Marggraf.

A. D. 1799—Achard invented method of extracting sugar from beets.

A. D. 1801—First sugar beet factory erected at Cunern, Silesia, where for several years small quantities of sugar from beets were produced. Two small factories in the meantime were erected in France, where experiments in field and laboratory were conducted for ten years without producing commercial sugar.

A. D 1811—Napoleon appropriated 1,000,000 francs for establishment of 6 technical beet sugar schools, and by imperial order 79,000 acres were planted in beets the following year. In two years 334 factories were operating in France due to the financial aid from Napoleon.

A. D. 1812—French agronomists discover that the sugar beet culture improves the soil. 100 French students sent to five large schools in France for manufacture of beet-root sugar—125,000 acres of land to be planted in beets. Napoleon created four imperial sugar factories.

A. D. 1812—Charles Derosne, a Frenchman, invented the bone black process for clarifying sugar now in universal use, and also suggested the use of quick lime in the purification of the juice.

A. D. 1813—M. Barruel, another Frenchman, suggested the use of carbonic acid for separating the excess of lime remaining after the purification of the juice.

A. D. 1830—P. Louis Leveque d'Vilmorin, the French seed grower, who conceived and developed new methods of selective sugar beet seed growing as means of increasing sugar content. Further developments of these experiments have resulted in the quadrupling of the sugar content in sugar beets.

A. D. 1832—de Dombasle invented diffusion battery and it was first installed in Seelowitz, Austria, in 1864. Today it is used in every sugar beet factory in the world.

A. D. 1838—First American beet sugar factory started by Edward Lee Church at Northampton, Mass., and in this factory the first American beet sugar was made.

A. D. 1840—The French Physicist, Jean Baptiste Biot, who about this time invented the polariscope, an instrument of vital importance in the commercial production of sugar.

A. D. 1848—Napoleon III. revived and offered protection to the French beet sugar industry. Due to this assistance the beet sugar production increased from 3,900 tons in 1848 to 263,000 tons in 1870, an increase of about 11,000 tons annually.

A. D. 1860—First sugar beet periodical started in Paris.

Lawrence Hardman's centrifugal machine began to be used extensively. By the use of this machine the molasses is separated from the sugar.

A. D. 1863—Dubrunaut for the first time applied the phenomenon of osmosis to extract the sugar from the molasses.

A. D. 1870—First commercially successful American beet sugar mill started by C. H. Dyer, at Alvarado, California. This mill is in operation today, with a capacity of 800 tons of beets per day.

A. D. 1870-1917—Industry has grown until in 1917 there were 99 factories in the United States with a daily beet capacity of 91,857 tons, as compared to one small factory with a small capacity in 1871.

BEET-SUGAR PRODUCTION, 1918 (REVISED FIGURES).
(1 ton=2,000 pounds.)

Year of beet Harvest.*	Sugar made.	Area harvested.	Beets worked. Amount.	Beets worked. Average per acre.	Beets paid for. Amount.	Beets paid for. Average per acre.	Average price paid for beets, per ton.	Total amount paid for beets.	Number of factories.
	Tons.	Acres.	Tons.	Tons.	Tons.	Tons.	Dollars.	Dollars.	Number.
California:									
1918	122,795	100,684	845,728	8.40	858,028	8.52	9.95	8,534,000	13
1917	209,325	161,909	1,321,716	8.16	1,331,548	8.22	7.60	10,125,000	14
Colorado:									
1918	191,880	125,882	1,363,277	10.83	1,443,846	11.47	10.02	14,474,000	14
1917	234,303	161,476	1,749,875	10.84	1,857,649	11.50	7.28	13,526,000	15
Idaho:									
1918	44,682	32,306	326,979	10.12	344,334	10.66	10.00	3,443,000	7
1917	38,376	37,745	286,446	7.59	312,067	8.27	7.06	2,203,000	7
Michigan:									
1918	132,092	114,976	835,768	7.27	907,718	7.89	10.08	9,152,000	16
1917	64,247	82,151	461,721	5.62	524,195	6.38	8.04	4,215,000	14
Nebraska:									
1918	63,494	42,746	453,266	10.6	485,070	11.35	9.96	4,833,000	4
1917	53,893	51,337	443,355	8.64	473,494	9.22	7.22	3,417,000	4
Ohio:									
1918	35,476	32,547	291,064	8.94	315,371	9.69	10.03	3,162,000	5
1917	24,467	24,234	202,624	8.36	219,931	9.08	7.18	1,580,000	5
Utah:									
1918	105,794	81,717	905,064	11.08	1,003,013	12.27	10.01	10,041,000	16
1917	83,662	80,289	696,522	8.68	762,028	9.49	7.04	5,368,000	15
Wisconsin:									
1918	13,358	12,400	93,467	7.54	99,777	8.05	10.00	998,000	4
1917	8,032	9,800	70,830	7.23	79,372	8.10	8.81	699,000	4
Other:									
1918	55,492	50,752	408,423	8.05	432,683	8.53	9.86	4,268,000	10
1917	48,902	55,856	392,456	7.03	420,093	7.52	7.28	3,059,000	13
United States:									
1918	765,063	594,010	5,523,036	9.30	5,889,840	9.92	10.00	58,905,000	89
1917	765,207	664,797	5,625,545	8.46	5,980,377	9.00	7.39	4[illegible],192,000	91
1916	820,657	665,308	5,919,673	8.90	6,228,256	9.36	6.12	38,13[illegible],000	74
1915	874,220	611,301	6,150,293	10.1	6,511,274	10.7	5.67	36,950,000	67
1914	722,054	483,400	5,288,500	10.9	5,585,000	11.6	5.45	30,43[illegible],000	60
1913	733,401	580,006	5,659,462	9.76	5,886,000	10.1	5.69	33,491,000	71
1912	692,556	555,300	5,224,377	9.41	5,648,000	10.2	5.82	32,871,000	73

*Acreage and production of beets are credited, as in former reports, to the State in which the beets were made into sugar.
Percentage of sucrose actually extracted by factories.
Based upon weight of beets.
Percentage of sucrose (pure sugar) in the total soluble solids of the beets.

List of Free V-C Crop Books

EVERY land owner and farmer will find these illustrated Free Crop Books of intense practical value, for they point the way to greater Prosperity on the farm, which means "increased yields per acre" and *better* crops.

The following list of Crops shows how extensively these Books cover every crop that may be profitably grown in the South. If you are interested in one or more of these, fill out the **Free** Coupon on the opposite page:

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Apricots
Artichokes
Asparagus
Barley
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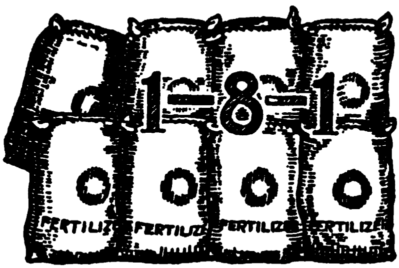
Beets
Berries
Blackberries
Cabbage
Cantaloupe
Carrots
Cauliflower
Celery
Cherries
Clover
Corn (Green)
Corn (Fodder)
Cotton
Cowpeas
Cucumbers
Dewberries
Egg Plant
Frames (Cold)
Fruits
Garlic
Grape Fruit
Grapes
Grasses
Green Corn
Hay
Hot Beds
Irish Potatoes
Leek
Lemons
Lettuce
Melons
Millet
Nectarines
Nuts
Oats
Okra
Onions
Oranges
Orchards
Parsnips
Parsley
Pecans
Peaches
Pears
Peanuts
Peas
Peppers
Pineapples
Plums
Potatoes (Irish)
Potatoes (Sweet)
Pumpkins
Radishes
Raspberries
Rice
Rye
Shallot
Snap Beans
Sorghum
Spinach
Squashes
Strawberries
Sugar Cane
Sweet Potatoes
Tobacco
Tomatoes
Trucks
Turnips
Vegetables
Watermelons
Wheat

INDEX.

Fertilizers of High Grade Analyses Save Time, Material, Labor and Money

Low Analysis



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THESE two piles of fertilizer—eight bags on the left, five bags on the right—contain exactly the same amounts of plantfood.

High analysis fertilizer saves three-eighths, or more of the *freight cost*—freight on five tons or less, instead of on eight tons.

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High analysis fertilizer saves three-eighths, or more of the bag costs—five bags instead of eight.

Finally, high analysis fertilizer saves at least three-eighths of storage costs.

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GROWING SUGAR BEETS

LUTHER BURBANK
SANTA ROSA, CALIFORNIA
U. S. A.

April
Nineteenth
1 9 1 9

Virginia-Carolina Chemical Co.,
Richmond, Virginia.

Dear Sirs:

Yours of January 14th and copy of "Making Soil and Crops Pay More" received in due season but we have been receiving some three hundred letters a day this Spring and this is my first opportunity to thoroughly examine the book.

This book gives more information in a condensed and accurate form than any on the subject which I have so far seen.

Your questions in Part Second and the answers to the same are remarkably illuminating.

Such a book in the hands of any farmer is almost equal to a farming education.

Respectfully yours,

Luther Burbank

VEGETABLES AND TRUCK CROPS

NORTHERN AND WESTERN GROWN

Published by

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RICHMOND, VIRGINIA

adv.
E. J. Bevel

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The Soil Improvement Committee of the National Fertilizer Association.

Crop	Sandy Soil APA-A-P	Loam Soil APA-A-P	Clay Soil APA-A-P
Alfalfa, seeded down	10-2-4	12-2-2	12-2-0
Alfalfa, top dressing	12-0-4	12-0-2	16-0-0
Asparagus	7-5-2	7-5-2	7-5-2
Apples, sod orchard	7-5-2	8-6-0	8-6-0
Apples, tilled orchard	10-3-4	10-3-2	12-3-0
Barley	10-2-4	12-2-2	12-2-0
Buckwheat	10-2-4	12-2-2	12-2-0
Brussels Sprouts	10-3-4	10-3-2	12-3-0
Beets	10-3-4	10-3-2	12-3-0
Beans, garden	10-3-4	10-2-4	10-2-4
Beans, field	10-2-4	12-2-2	12-2-0
Blackberries	12-2-2	12-2-2	12-2-2
Corn, for grain	10-2-4	12-2-2	12-2-0
Corn, for silage	10-2-4	12-2-2	12-2-0
Clover, seeding	10-2-4	12-2-2	12-2-0
Clover, top dressing	12-0-4	12-0-2	16-0-0
Cabbage	10-3-4	10-3-2	12-3-0
Cauliflower	10-3-4	10-3-2	12-3-0
Carrots	10-3-4	10-3-2	12-3-0
Cucumbers	10-3-4	10-3-2	12-3-0
Celery	10-3-4	10-3-2	12-3-0
Grass, seeding	10-2-4	12-2-2	12-2-0
Lettuce	10-3-4	10-3-2	12-3-0
Millet	10-2-4	12-2-2	12-2-0
Meadow, top dressing	7-5-2	8-6-0	8-6-0
Mangels	10-3-4	10-3-2	12-3-0
Melons	10-3-4	10-3-2	12-3-0
Oats	10-2-4	12-2-2	12-2-0
Onions	8-2-8	8-2-8	8-2-8
Permanent Pastures, top dressing	12-0-4	12-0-2	16-0-0
Parsnips	10-3-4	10-3-2	12-3-0
Potatoes, late	10-3-4	10-3-2	12-3-0
Peas, field	10-2-4	12-2-2	12-2-0
Peas, garden	10-3-4	10-2-4	10-2-4
Peaches	7-5-2	8-6-0	8-6-0
Rye, fall seeding	10-2-4	12-2-2	12-2-0
Rye, spring top dressing	7-5-2	8-6-0	8-6-0
Rutabagas	10-3-4	10-3-2	12-3-0
Raspberries	12-2-2	12-2-2	12-2-2
Sweet Corn	10-3-4	10-3-2	12-3-0
Sugar Beets	10-3-4	10-3-2	12-3-0
Spinach	7-5-2	7-5-2	7-5-2
Strawberries, spring setting	10-3-4	10-3-2	12-3-0
Strawberries, top dressing	7-5-2	8-6-0	8-6-0
Squash	10-3-4	10-3-2	12-3-0
Timothy, top dressing	7-5-2	8-6-0	8-6-0
Turnips	10-3-4	10-3-2	12-3-0
Tomatoes, cannery	10-2-4	10-2-4	10-2-4
Wheat, fall seeding	10-2-4	12-2-2	12-2-0
Wheat, spring top dressing	7-5-2	8-6-0	8-6-0

VEGETABLES AND TRUCK CROPS

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"Say, Sam: How you reckon dey raises sech big watermilluns like dis, on dis heah Missury lan' eny how?"

"Well, Jim: Ah tells yuh how 'tis; dey uses dis heah V-C Fuhtilizeh on de lan'—and dat suah do make 'em grow big. Dat's de same stuf whot yoh got yo feet in las' Spring—dat's what make 'em so big."

Vegetables and Truck Crops

Northern and Western Grown

Published by
CROP BOOK DEPARTMENT

VIRGINIA CAROLINA
V-C Fertilizers
CHEMICAL CORP.
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Although the supply of plant food a soil is able to furnish is one of the determining factors in crop production, other conditions are quite as important. Plants must have for their home a soil that is well drained, that is in good physical condition and that is not too acid. These conditions must be corrected in order to get the best results from the use of fertilizer. Further, the preparation of the soil, the kind of seed used, and the methods of cultivation may vitally affect the yield of the crop.

The Virginia-Carolina Chemical Company recognizes these facts, and in order to aid the farmer in securing the best results in growing of crops, has provided within its organization an

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directed by a practical and scientific agronomist, who will give personal attention by letter to any question pertaining to soils and crops the reader desires to ask. This service is free.

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Virginia-Carolina Chemical [redacted] Corp.
Richmond, Virginia.

Vegetables and Truck Crops

Northern and Western Grown

The growing of vegetables and truck crops is one of the most intensified kinds of agriculture. Every farm has its garden and every city has its truck gardens which yield the annual supply of fresh products for the table and for canning and storing. It is doubtful if there are any other opportunities in agriculture today which are as attractive as truck farming on muck and sandy loam soils that are situated in our own states near the large centers of population and the best of markets.

Many types of farmers, such as fruit-growers and poultry men, find it profitable to grow tomatoes, cabbage, potatoes and melons on part of their farm in connection with their other work. General farmers who have a few acres of land specially adapted to truck crops often grow onions, celery, cabbage, potatoes, peas, beans or sweet corn as a part of their farm operations and realize attractive profits from it. Many of these crops fit well into the rotation on the general farm and yield high returns on the investment. Generally speaking, truck crops are not hard on the land because they are given liberal applications of fertilizer and careful soil treatment. The crops that follow them in the rotation are greatly benefited.

To be successful in growing vegetables and truck crops the farmer, or gardener should know the special requirements of the crops and should be a man of good business ability. Special training and equipment are required to handle large acreages of certain truck crops efficiently and these needs should be known and provided for before any attempt is made to undertake the work on a large scale. Therefore, one should begin this work on a small scale and increase as experience and profits justify.

Demand for Vegetables Increasing

The people are, at last, realizing more fully the value of vegetables in the diet for maintaining the health and vigor of the body. Vegetables add succulence and bulk to the food and keep the entire digestive system toned up and active. They furnish the body starches and proteins as well as highly important mineral salts and acids which are essential to health. Iron, phosphorous, lime, sulphur and many other elements are found in vegetables in a more available form than can be purchased in the form of patent medicines and the continued use of more vegetables and fruits would eliminate the need of the "spring tonic."

The population of the cities is growing rapidly and the meat products are becoming scarcer and more expensive. For these reasons there is a growing tendency to use more fruits and vegetables and this has stimulated a greater interest in commercial gardening.

Markets Should be Chosen Carefully

The most important factor to consider in market gardening or truck farming is the market, because most of these crops are comparatively perishable and need to be placed upon a good market in first class condition. Exception is taken to such crops as navy beans, potatoes, onions, etc., because they can be stored and shipped well. Sweet corn, peas and tomatoes which are grown on contract for canning factories are exceptions to the rule.

Transportation facilities have been greatly improved so that it is now possible to ship perishable crops quite safely to distant markets and this factor has made it possible to extend the industry into many outlying sections which have soil well adapted to many profitable crops.

Large cities offer a market for almost unlimited quantities of strictly

Home of Mr. W. H. Deckerson, Hatfield, Mass. Mr. Deckerson has found V-C Fertilizers to be the best and he uses it on all his crops.

fresh vegetables and the price is comparatively stable except in periods when the market is glutted. There are a large number of growers competing on these markets and this is oftimes responsible for the low prices which occur at certain periods, but strictly high grade vegetables do not suffer under average conditions.

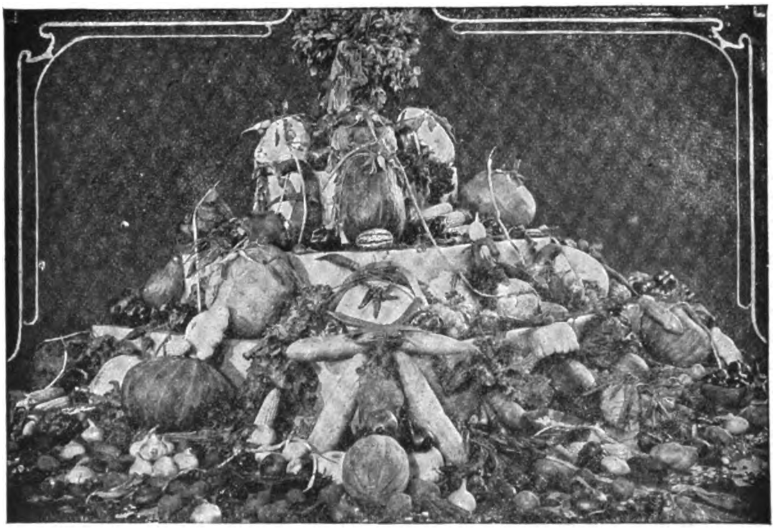
The markets of the small cities do not become glutted under normal conditions and are pretty safe. It is easier to develop a good reputation in

such places and this is an important feature. These outlets are not so discriminating as the larger markets, but high quality is always at a premium and is paid for.

Summer resort regions offer an attractive market for vegetables and farmers in such sections should consider such crops for these special markets.

Strictly First Class Vegetables in Demand

The important thing to keep in mind is that strictly first class products are always in demand and can be profitably marketed. The crops should be grown in advance of the regular season for biggest profits. Judgment must be exercised in selecting the crops and varieties to be planted so that market preferences can be taken advantage of. Failure to do this may result in loss.



Vegetables like these are a result of the liberal application of the bountiful crop producers—V-C Fertilizers.

The selection of crops to be grown will depend upon a number of factors other than the market. Among these, the soil type is important even though a good gardener with a fair market may "make good" on a wide variety of soils.

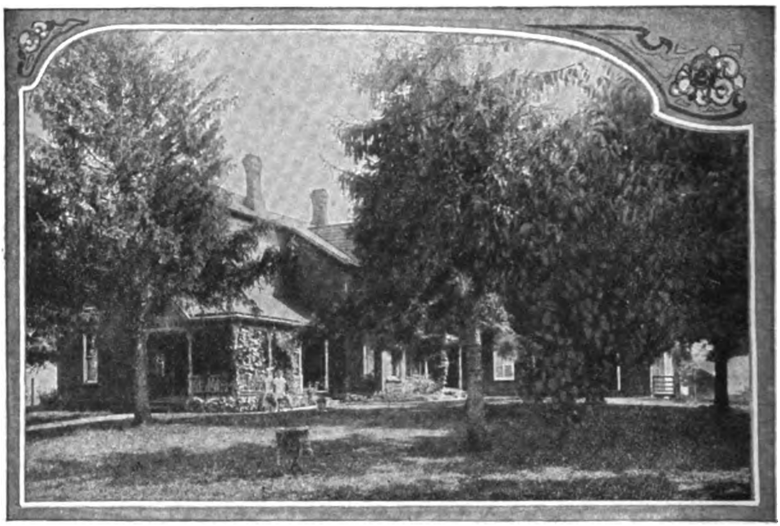
Soils Adapted to Vegetable Growing

Many types of soil, such as the mucks and light sandy loams, which have not been productive when planted to the general farm crops can be made to produce profitable returns when properly planted and tended in

truck crops. This fact has made vegetable growing attractive to many farmers who have small tracts of light soil on their farms. Large sections of muck land are being developed and planted to truck, and great areas of light sandy loam soils and stump ground are being put under cultivation for market gardening and truck growing.

Practically all good agricultural soils which contain an abundant supply of organic matter and receive a sufficient supply of rainfall will, if well drained, grow profitable crops of vegetables if intelligently managed and properly fertilized.

The sandy loams with good porous subsoils are most popular for trucking. The fine sandy loams are exceptionally well adapted to early crops, melons, potatoes, tomatoes, etc.



This modern and comfortable residence is that of Mr. William Fleet, on his Tiffin, Ohio, farm. Mr. Fleet is an enthusiastic V-C Fertilizer user and booster.

Bottom land and the loams are specially adapted to potatoes, sweet corn, peas, beans and tomatoes. Muck and peat soils are used for celery, onions, cabbage, peppermint, root crops and late truck.

Other important features for the growers to consider are average climatical conditions, water supply, good roads, availability of surplus manure, equipment on hand, extra capital necessary, labor conditions and railroad facilities.

Profits:

The profits from this type of farming vary considerably from year to year, just as the profits from any other business does. Climatic and market conditions are the most important causes of variation. A survey covering

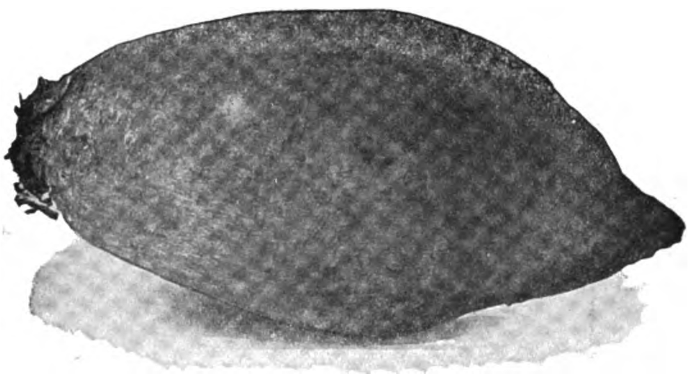
a series of years showed that the profits in market gardening and truck farming averaged from $50 to $400 per acre annually. Many careless, unprogressive men do not realize much more than a living, while many records show profits of $500 to $800 per acre.

These differences are not entirely due to farming conditions. The operator is the important factor and it should be said that big profits in vegetable growing depend largely upon energy, brains and the judicious use of commercial plant food.

Fertilizers for Truck Crops

Stable Manure Important:

Stable manure and green manures have long been acknowledged as essential fertilizing materials for the growing of all kinds of vegetables.



The Mangel Wurtsel Beet is coming into favor as a stock feed. Abundant yields per acre secured by the use of Commercial Fertilizers.

It is true that some types of soils will produce large yields of these crops for a number of years by depending entirely upon commercial plant food, but this practice is not to be recommended, even upon muck soils which are rich in organic matter. Manure improves the physical condition of the soil, increases its water holding capacity, introduces and encourages the action of necessary bacteria, and this is quite important on muck and peat soils, because it aids vital chemical changes that are conducive to plant growth.

Manure which has been piled carefully for six months will give better results than fresh manure for a large number of crops and the danger of introducing weed seed is minimized. On a large number of farms, however, circumstances make it necessary to apply the manure whenever it is possible to get it.

Stable manure is applied in amounts varying from 10 to 50 tons per acre, depending upon the amounts available and the crops to be grown. Coarse manures are usually plowed under but fine manure is most effectual when applied on top of the ground after it is plowed.

It is evident that one should be able to obtain large quantities of manure for maximum results and inability to do this necessitates the use of green crops to be turned under. This system requires that a rotation be practiced and part of the land be devoted to manurial crops instead of vegetables.

Green Manures and Cover Crops:

The use of rye, soybeans, millet, cowpeas, etc., is popular with truck growers because it is an economical and valuable method of adding organic matter to the soil and tends to lessen the danger from insects and diseases. These crops should be heavily fertilized so that a large amount of growth may be obtained to turn under for improving and enriching the soil.

Commercial Fertilizers:

The practical and progressive grower is interested in realizing the largest net profit per acre. High yields, high profits and high quality depend largely upon the liberal and intelligent use of commercial plant food. Rapid growth causes vegetables to be crisp and succulent—two qualities which the market demands. It also hastens early maturity, which permits the grower to put the crops on the market while the price is high and enables him to plant succession crops on the same ground and thus reap a greater profit from the land. The quality of vegetables is influenced by their ability to make a rapid growth. Slow development causes the crops to be tough, woody and lacking in desirable flavors.

To obtain rapid growth it is essential that sufficient plant food be available to the plant at all times. Stable manure and decaying organic matter will help but are not properly balanced fertilizers for many crops and should be supplemented with commercial plant food. It is practically impossible to obtain enough barnyard or stockyard manure to meet the demands of market gardeners and this shortage may be successfully overcome by making liberal applications of fertilizer.

Stable manure and cover crops which have been plowed under must undergo processes of decay before the plant food in them becomes available to the crops and this is another reason for supplementing such materials with commercial plant food. Best results depend upon the use of plenty of manure or cover crops to maintain the supply of organic matter in the soil and upon adding to this sufficient fertilizers ot insure rapid growth of the crops.

A survey of the work of practical growers and Experiment Stations shows conclusively that proper fertilization increases the net profits from $10 to $100 per acre and these facts are sufficient evidence to progressive growers to justify the liberal and intelligent use of commercial fertilizers. The value of fertilizer depends on the amount of available nitrogen, phosphoric acid and potash it supplies to the soil for the plants. These elements are frequently limiting factors in production and a surplus of each is necessary for maximum production and high quality.

The recommendations in this booklet are based upon the demands of the crops and will serve as a guide to gardeners. At present, few fertilizers can be obtained which contain more than three per cent. of potash. Consequently, gardeners and truck growers will not be able in many cases to obtain fertilizers of the analysis recommended until the war ends. As soon as possible, the recommended analyses should be used, as they will be more profitable under normal conditions.

It is customary when recommending fertilizers for particular crops to indicate the analysis of the fertilizer by means of a series of numbers; for example, 3-10-4. The first number, (3), represents the per cent. of available nitrogen in the material; the second number, (10), represents the per cent.

Grading and packing canteloupes in the shed of Mr. C. M. Yates, Decker, Indiana. The better the land is fed with V-C Fertilizers the better will be your crops.

of available phosphoric acid; and the third, (4), indicates the per cent. of available potash.

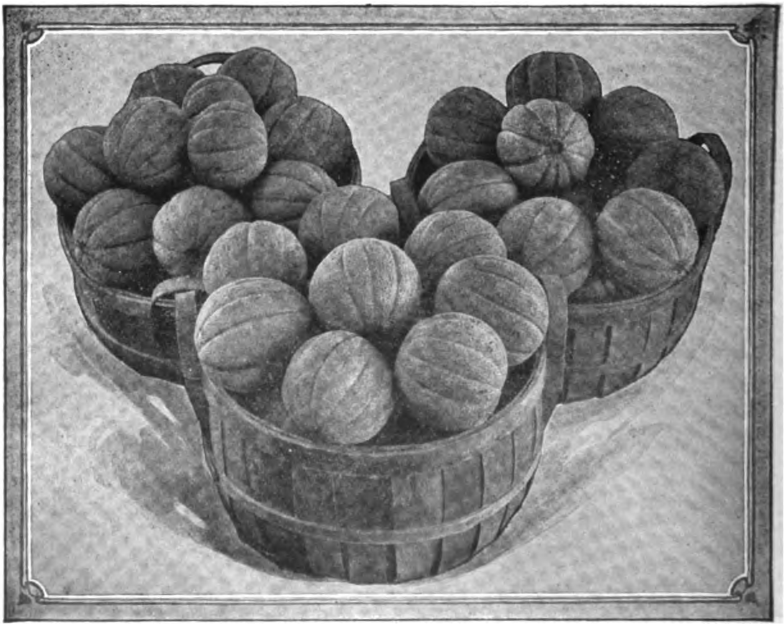
Nitrogen:

This element is essential because it is essential in making growth of the green or succulent parts of the plants. Its presence is therefore quite important in growing such crops as celery, onions, cabbage, lettuce, beets and related crops. The nitrogen in fertilizers for truck and garden crops must be readily soluble to be of much value. This element is obtained in various forms, such as nitrate of soda, sulphate of ammonia, dried blood and tankage. Nitrate of soda is the most available source of nitrogen and is

used as a top dressing for truck crops and also in the making of fertilizers. Sulphate of ammonia, dried blood and tankage, in the order named, are each more slowly available than nitrate of soda. Each of these is extensively used in the manufacture of fertilizers.

The nitrogen supply for many vegetable crops should be available throughout the entire growing period and fertilizer for these crops should contain nitrogen derived from each or at least three of the different nitrogen carrying materials. The other elements should also be in readily available form and V-C Fertilizers are designed to supply these needs most effectively.

It is possible to apply nitrate of soda with the regular truck fertilizer before planting the crops or it may be applied as a top dressing between the



A winning trio. Such splendid cantaloupes as these will bring top prices in any market.

rows. Its use is particularly valuable in the spring when the weather is cool. It is possible to have a return of $40 to $50 from the use of $5.00 worth of nitrogenous fertilizer on such crops as early tomatoes, cabbage, beets, etc. Poor growth and pale green color of the leaves indicates a need for nitrogen.

Phosphoric Acid:

Soils which are deficient in phosphoric acid cannot mature a large crop satisfactorily. It stimulates the growth and influences heavy production

and early maturity. Fertilizers high in phosphoric acid may be profitably used on most truck crops. This element is supplied in acid phosphate, steamed bone meal, tankage and blood and bone meal and the surplus that is not used by the crop recombines in the soil and does not leach away.

Potash:

Many soils, such as muck and sandy loams, need considerable potash for maximum production. Marsh, or muck land that has been drained and reclaimed needs heavy applications of potash for many crops, such as onions and sweet corn. It is an important element in the growing of root crops, such as beets, potatoes, carrots, etc., and should be used in an available form if it can be obtained at a nominal price.

Picking cantaloupes on farm of Messrs. Lane Brothers, Decker, Indiana.

Lime:

Many soils which have been cropped for a long time are acid and should be given an application of 2 to 4 tons of finely ground limestone per acre. Acid soil conditions are associated with poor growth and a yellowish-green or brownish color in the leaves between the veins. Lime neutralizes the acid condition, improves the physical condition of the soil and seems to prevent some disease fungi from affecting the roots of certain plants; for example, the club root of cabbage.

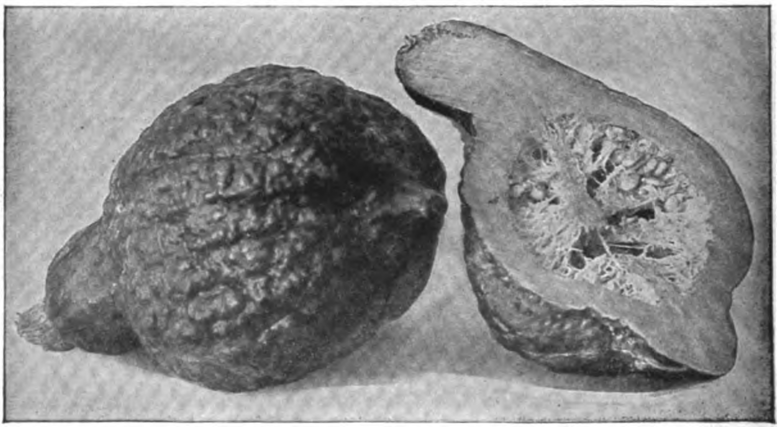
Rate of Applying Fertilizers:

Detail directions for fertilizing each crop will be given under the cultural directions for that crop, but it is well to discuss the general facts relating to the application of commercial plant food to truck crops.

Many growers are convinced that the use of fertilizer is profitable but have never been informed regarding the possibilities of its use. For maximum production there must be a surplus of each element needed for the development of the crop. In trucking districts around Norfolk, Va., the growers apply as much as 2,000 pounds per acre profitably. The rate of application should vary from 500 to 2,000 pounds per acre, depending upon the crop and existing soil conditions.

How to Apply Fertilizers:

Fertilizer may be applied broadcast with fertilizer attachment of grain drill and with lime sowers and special fertilizer distributors. Gener-



Two fine Specimens of the Hubbard Variety of Squash.

ally speaking, most of the fertilizer applied for truck and garden crops is applied broadcast, but for many crops a part or all of the fertilizer may be applied in the rows. One-row distributors are frequently used for this purpose. Many machines of this type apply the fertilizer in a furrow made with a plow and also mix the fertilizer with the soil. Hand spreading is also practiced extensively in gardens and small lots.

It is necessary to keep in mind the fact that no amount of fertilizer will make up for poor soil conditions, depleted supply of organic matter, lack of moisture or poor seed. All conditions must be suitable for maximum production.

Classes of Vegetable Crops

It is customary to divide garden and truck crops into classes based upon the seasonal requirements of the plants. Such a division serves as a

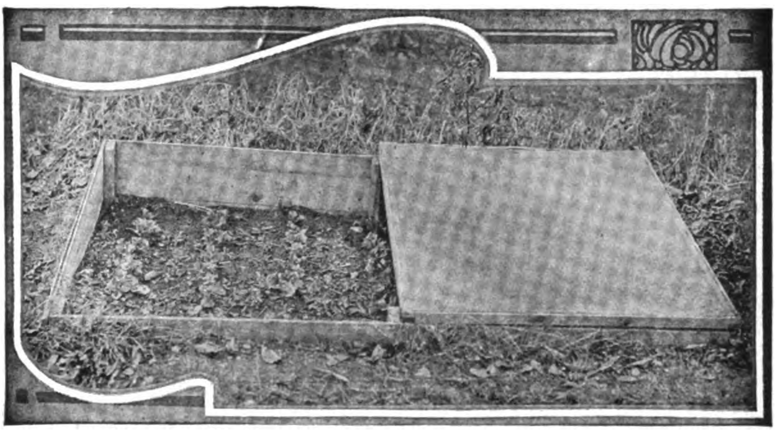
guide to those who are branching out in the production of these crops. The following classification is simple and helpful.

Cool season crops which should be started in the hotbed or cold frame—early cabbage and cauliflower, celery, early dry onions, early kohlrabi.

Cool season crops which are planted in the open ground—peas, beets, turnips, beans, chard, spinach, early potatoes, green onions, kale, late cabbage, late cauliflower, carrots, salsify, parsnips, radishes, late celery, cress, endive, kohlrabi and parsley.

Warm crops which should be started in the hotbed—tomatoes, egg plant, peppers, cucumbers and sweet potatoes.

Warm crops which may be started in the frames but which are usually planted in the open soil after danger of frost—lima beans, melons, cucumbers, sweet corn, pumpkins, squash, etc.



Small Cold frame and cloth cover.

The Use of Hotbeds and Coldframes

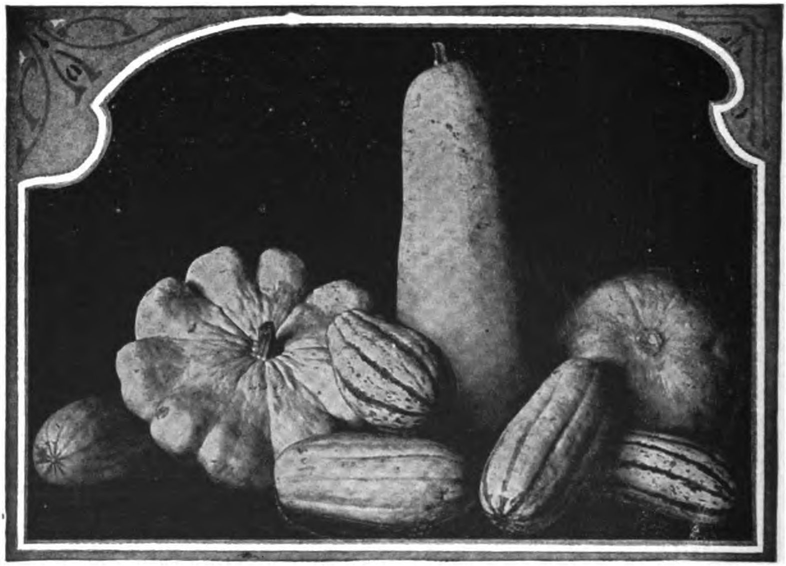
The great majority of market gardeners and truck growers find it profitable to use hotbeds or coldframes for starting the young plants several weeks before the weather will permit planting them in the ground. **Vegetables matured before their normal season go on the fancy market and bring the highest price.** Crops which require a long season to mature and those crops which must mature before hot weather sets in, may be grown more successfully by starting the young plants in a heated frame or hotbed during the late winter months. In the southeastern trucking sections cold frames are used extensively and many varieties of vegetables are matured in them, while farther north greenhouses and hotbeds are more common.

Many crops may be harvested in time to plant a second crop on the same ground if the plants have been started early. Tomatoes, melons, egg plant, cucumbers, peppers, etc., will produce more heavily if the young

plants are well grown under glass or canvas early in the season. They are also better able to withstand the attacks of diseases and insects than the late crops.

Hotbeds:

Much of the success of gardening depends upon strong thrifty plants and the best way to get these is to grow them yourself. Nearly every farm should have a hotbed for home use, even though commercial gardening is not contemplated. They are inexpensive and easy to care for and will add much to the efficiency of production. The hotbed should be placed near the



Some prize winning varieties of squashes exhibited at the Illinois State Fair. Such excellent results come only from soil which is amply fertilized.

farm buildings so that frequent attention may be given it during the day. It should slope toward the south and be protected on the north and west by a windbreak. The ground should be as nearly level as possible to facilitate watering, hauling, etc.

The ordinary hotbed consists of a frame, glass sash covers, and a pit containing fresh horse manure and compost soil. The frame is usually six feet wide and may be made as long as needed. The standard sash for covering the frame is six feet long and three feet wide. The north side of the frame should be six inches higher than the south side, therefore 16-inch boards are usually used for the north side and 10-inch ones for the south side. One and a half or two inch lumber should be used in construction. If the frames are to be permanent, the corners may be dovetailed together. A

common method of building them is to use angle irons and bolts to hold the sides and ends together and this makes it easy to knock the frames down for storage or removal.

The pit is dug as long and wide as the frame and 18 to 24 inches deep. A tile or trench is dug down the middle of the pit and filled with stones to provide drainage. At each corner of the pit a 2 inch x 4 inch stake is driven to support the frame. The top of the stake should be about an inch below the level of the ground so that the bottom of the frame will be slightly below the surface of the soil. After putting the frame in place several inches of dirt should be banked against the sides of the frame.

Heat must be provided because the tender plants which are grown in hotbeds cannot withstand the low temperatures which prevail at times during March and April. Fresh horse manure is usually used to produce the heat, but some growers use heat from flues or steam pipes. The fresh manure is mixed thoroughly with a third of its bulk of straw, litter or leaves and is allowed to stand under a shed until used in the hotbed. About one wagon load of manure is required for every 20 square feet of hotbed. After the straw and litter have been mixed for 3 or 4 days the mixture should be forked over and on the eighth day it should be placed in the pit. The material should be tramped thoroughly as it is put in the pit and the sides and corners should be kept well filled to prevent settling. The pit should be filled level with the lower edge of the frame on the south side. A six-inch layer of rich garden soil is then screened and placed on the manure and the sash are put in place and the bed is left to heat for eight or ten days. By that time the temperature should have dropped to 85 degrees and the seed may be sown.

A thermometer should be kept in the hotbed so that a uniform temperature may be maintained. Such plants as cabbage, cauliflower, lettuce, onions, etc. prefer a temperature about 60 degrees, while tomatoes peppers, egg plants, etc. do best in a temperature ranging between 75 and 85 degrees. If both classes of plants are grown in the same frame, a temperature of 70 to 75 degrees should be maintained. In cool weather the beds may be ventilated by raising the sash on the north side and in warm weather the sash may be partially or entirely removed during the day time.

Cool, damp draughts should not be permitted to strike the plants because they will check their growh. A week or two before the plants are to be transplanted in the field they should be hardened off by removing the sash or transferring the flats to a cold frame.

The plants in the hotbed must be watered properly. One important feature is to water the soil thoroughly but not often. To do this it will be necessary to examine the soil occasionally to determine its moisture condition. When the sash are closed evaporation is very slight and watering every ten days may be sufficient, but during warm days in April when the sash are off occasionally it may be necessary to water the soil every other day. During cool weather the water should be applied in the morning, but in warm weather it may be applied in late afternoon. A fine sprinkler should be used to water hotbeds.

Surface Hotbeds:

Those who need a hotbed but do not wish to dig a pit may prepare a hotbed on the surface. Such a one may be made by building a regular frame and placing it on top of a pile of manure which has been mixed with litter and forked over in the regular way. The pile should be made two feet deep and

two feet wider and longer than the frame. The soil should be put in the frames and manure banked on the sides of the frame in the usual manner. The management of the frame is the same as described for the pit hotbed.

Coldframes:

The coldframe is perhaps the most economical frame to construct and can be used successfully by most any grower. Plants are started in it after

Real Giants in every sense of the word. These giant peppers will bring the best price in any market on account of their size and quality. Use V-C Fertilizers and your crops will be of the finest quality if your other methods of cultivation have been correctly done, and the weather conditions are favorable.

the weather opens up in April. It is used to harden off plants which have been grown in hotbeds if that space is needed for more young plants.

The frame is made practically the same as described for the hotbed, but cheaper materials may be used. The top of the frame is covered with canvas, muslin or glass and no excavation or heating materials are needed. Oiled muslin is often used for the covering material also. The management

of the frame is quite the same as that of the hotbed. The canvas cover is rolled back in warm days and left down in cold weather.

The soil for hotbeds and coldframes should be quite rich in organic matter and available plant food, because the young plants must be able to make a strong, vigorous, stocky growth. In addition to adding compost or rich garden soil it is advisable to mix in two pounds of V-C Fertilizers analyzing 2-10-4 to every 10 square feet of soil. The soil must be fine and free from coarse material. Thoroughly rotted manure and sand also may be mixed with the soil to improve its physical condition.

Growing the Plants in Hotbeds or Coldframes

The first consideration in growing plants is to obtain high grade seed of desirable varieties. The best seed is always the cheapest in the long run

Method of growing lettuce in greenhouse. Hothouse vegetables always command the fanciest prices.

and growers should demand it because high producing strains are more profitable than low ones. Good market varieties are preferable. The seed should be tested to be sure that it germinates strong and vigorous.

After the temperature in the hotbed has fallen to 90 degrees the soil should be leveled down and the seed sown thinly in shallow rows which are 4 to 6 inches apart. The rows should run from north to south across the bed.

After the plants have begun to grow well they should be thinned, leaving them at least one inch apart in the row. When the plants are well started and the true leaves have formed they should be transplanted into flats. These flats are made 15 inches wide, 20 inches long and 2 inches deep inside measurements and these are filled with compost or rich garden soil. The objects of transplanting the young plants into flats are many: (1) a uniform number of plants may be grown in them; (2) a smaller amount of hotbed space is required; (3) the moisture conditions may be easily controlled; (4) the plants will be stronger and more stocky; (5) the root systems are

bunched and the plants do not suffer severely when set in the field; and (6) the plants may be taken to the field in excellent condition.

The transplanting of young plants from the frame into the flats should be done on cloudy days whenever possible, because there is less danger of the plants wilting before the root systems readjust themselves. In cold weather the plants may be taken from the hotbed to a warm room and transplanted into the flats.

Preparation of the Land:

Truck farming and market gardening are intensive forms of agriculture and the very best soil conditions must prevail. The old saying that "a crop well planted is half grown" is particularly true here. Deep and thorough preparation is imperative and it is important to keep in mind the fine condition of a well prepared garden soil.

Sandy loams or dark loams may be plowed in the early spring, but clays should be plowed in the late fall if possible. In the case of spring

The master crop gorwers—V-C Fertilizers—were used on this field of Fall Irish Potatoes, grown by Mr. Henry Wilkins. If appearances indicate yields, Mr. Wilkins will surely have a bumper crop.

plowing the ground should be dragged or disked within 24 hours after it is plowed. Disking before plowing may often be practiced to advantage. Do not attempt to plow a large field before beginning to drag or disk it, because considerable moisture will be lost and clods are liable to form. It is better to work the soil after each day's plowing than to wait for a rain to put it into suitable condition for the disk or drag.

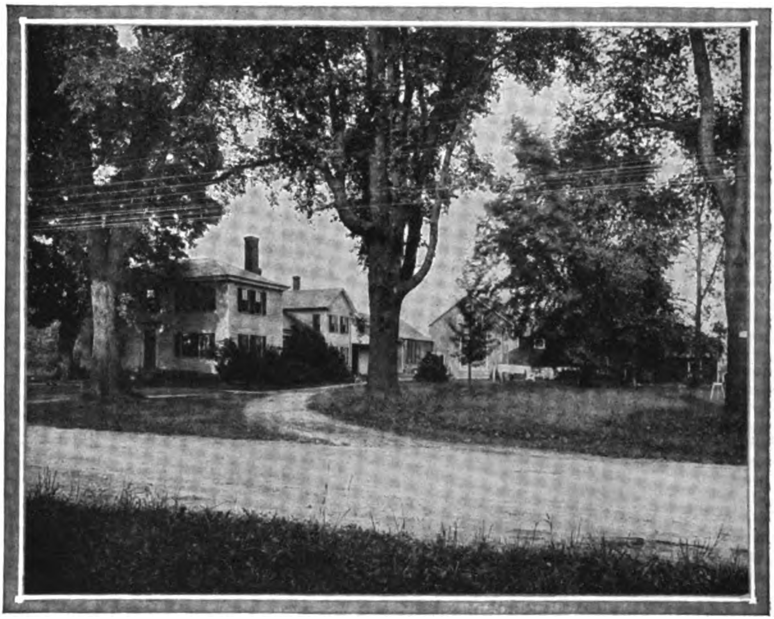
If fresh manure is to be applied to the land it should be thoroughly disked in before the ground is broken. Well-rotted manure may be applied as a top dressing after the land is plowed and worked into the soil with a harrow. In this way the danger of weeds will be lessened and the manure will become incorporated with the soil. The seed bed should be worked occasionally until time to set the plants.

The roller may be used for bringing up the moisture during dry weather. At planting time the harrow and the drag, or float should be used frequently to give the soil its final preparation. This will insure a fine seed bed and will

conserve moisture so the young plants may have a suitable place to develop. Excellent cultivation of the soil before planting will rid the soil of many weeds and grasses which cause so much work later in the season and make possible a rapid and uninterrupted growth of the vegetables.

Applying Fertilizer:

Generally speaking, the fertilizer should be applied with a fertilizer drill or distributor after the land has been prepared. It is worked into the soil thoroughly with a harrow before planting the seed or setting the plants.



Residence of Mr. R. L. Cook, of Old Hadley, Mass. Mr. Cook is another one of the host of enthusiastic V-C Fertilizer users.

There are several types of fertilizer distributors that are successful. The wide ones are used for broadcast work and the narrow ones for applying fertilizer between the rows of growing crops.

Fertilizer may be applied by hand if the regular distributors or attachments are not at hand. In either case the bags of fertilizer should be distributed over the field to eliminate carrying the material further than necessary. It is a common practice to apply a complete fertilizer high in nitrogen or nitrate of soda between the rows of plants after they are 3 to 5 weeks old. This should be done just before cultivating so the fertilizer may be mixed with the soil immediately.

Sowing Seed and Setting Plants:

The seed for tomatoes, cabbage, large onions, peppers, etc. are usually planted in the hotbed during the latter part of March or in the coldframe three to four weeks later. These plants are transplanted to the field when weather conditions are suitable and the work is usually done by hand on a cloudy day or late in the afternoon if the area is not too large. Many large growers use transplanting machines successfully and while these machines have a number of advantages they cannot be economically adapted to the work of all growers. The plants should be set deeper in the field than they were in the frame.

When sowing seed in the field it is customary to use the hand seed drills, because they can be set to do the work accurately and rapidly. The

Squash and Corn Field, Royal Oak, Michigan. Proper preparation, cultivation and fertilization are important factors in successful and profitable farming.

width of the rows will depend upon the crop planted and upon whether or not horse cultivation is to be practiced. No definite rules can be given regarding the proper depth of planting the seed because the size of the seed, kind of soil, etc. must be taken into consideration, i. e. seeds are planted deeper in a rich loam than a clay soil.

Thinning:

An important practice that is hard for the inexperienced grower to adopt is thinning the young plants in the rows in the hotbeds, coldframes and in the field. Careful and successful growers appreciate the importance of this work and it merits the serious consideration of all who have not given it much attention. Thinning should be done early and the weak and crowded plants removed so the permanent plants may become stronger and more thrifty.

Cultivation:

All gardeners and farmers appreciate the value of a sufficient supply of moisture to meet the crop needs. Nothing will contribute more to conserving the moisture supply than thorough cultivation, and unlessthe surface of the soil is stirred constantly during dry weather, the chances for success will be lessened. Frequent cultivation improves the tilth of the soil, keeps down weeds, permits the air and rain to penetrate the soil more freely and maintains a soil-mulch which prevents the evaporation of soil moisture. By good cultivation is meant the maintenance of a clean, loose soil free from weeds, clods, etc. Cultivation should begin long before the crops are planted and should be continued until the needs of the crop are satisfied.

Spraying three rows of melons at a time on Farm of B. H. Pass & Sons, Dexter, Indiana, with a horse-power sprayer. The most profitable results from the crop are obtained when the disease and insect pests are controlled. V-C Fertilizers overcome a great deal of this damage by keeping the plant in a thrifty condition.

Weather conditions will regulate the frequency of cultivation, but under normal conditions once every week will suffice. It is important to emphasize the fact that the land should be worked as soon after each rain as soil conditions will permit.

The depth of cultivation will depend upon the crop, but it is safe to say that early cultivations may be deep but the later ones should be shallow because the root systems of many plants develop close to the surface when they approach maturity. Level cultivation is generally recommended in preference to "ridging" or "hilling up" because it reduces evaporation.

Asparagus

Asparagus is one of the earliest and most important truck crops. It may be well grown on a wide variety of soils that are well drained and well supplied with organic matter. Deep sandy loams and sandy muck soils are probably best adapted to its growth. A constant and sufficient supply of moisture is essential and this condition usually prevails in deep soils containing an abundant supply of organic matter, if well cultivated.

The plants may be grown from seed or from one or two year old roots. If seed is to be planted, high grade selected seed from four year old plants should be obtained and planted in the spring in rows 18 inches apart and 2 to 3 inches apart in the row. These plants are transplanted when one or two years old. The quickest results can be obtained by purchasing strong one year old roots from the nursery or seed dealer. These may be planted in the fall or early spring in rows which are made by throwing a deep furrow with a turning plow.

Three hundred to four hundred pounds of V-C Fertilizer analyzing 4 per cent. of nitrogen, 8 to 10 per cent. of phosphoric acid and 6 per cent. of potash should be worked into the row by plowing back through it. Well-rotted manure applied in the row before or after planting will help the roots make a good growth.

The roots should be planted 6 to 8 inches below the level of the ground and the root systems spread out well and covered firmly with 2 inches of soil. More soil is gradually drawn in on the plant as it grows so that the rows will be leveled by fall. A few weeks after setting the roots, another application of 300 to 500 pounds of fertilizer should be applied to the acre and this followed by two or three light applications of nitrate of soda. This method will develop large, thrifty roots capable of heavy production. The asparagus plants occupy the land for several years and should be heavily fertilized with well-rotted stable manure and commercial plant food. Many of the most successful growers apply from 1,000 to 2,500 pounds of fertilizer per year. Rapid growth is essential for quality and flavor.

Cultivate frequently during the first and second summers and disk the ground in the fall.

Cutting should not commence before the third season and should not continue for more than three weeks that year. After the third year the plants may be cut from 6 to 8 weeks. A heavy application of fertilizer should be worked into the soil early in the spring with a disk harrow. Cultivation should be continued until time for the shoots to appear. Immediately after the cutting season is over another application of fertilizer should be made and the soil thoroughly cultivated. At the end of the season when the berries are turning red, mow the stalks down, rake them off of the field and burn. The soil should then be given another harrowing.

Beans

The string bean is a popular and easy crop to grow and if placed on the market before or after the time the market is well supplied, an excellent profit can be realized. Canning companies contract for the green crop and the dry bean is a standard market crop which fits into the farm rotation and can be grown successfully on a large variety of soils.

A splendid field of beans.

Beans are divided into three classes: (1) Snap or string beans, which are eaten in the immature state, pod and all. (2) Green shell beans, which are harvested and removed from the pod. This includes the lima and some string beans. (3) Dry shell beans, which mature in the pod and are threshed. The latter class includes navy beans, dry limas, etc.

Soil

Any well drained fertile loam soil will produce good yields of beans. Muck or peat soils are not adapted to this crop because they contain too much nitrogen which causes a rank growth of vine and poor fruiting. The soil should contain a sufficient supply of decaying organic matter so that the maximum results may be obtained from the fertilizer.

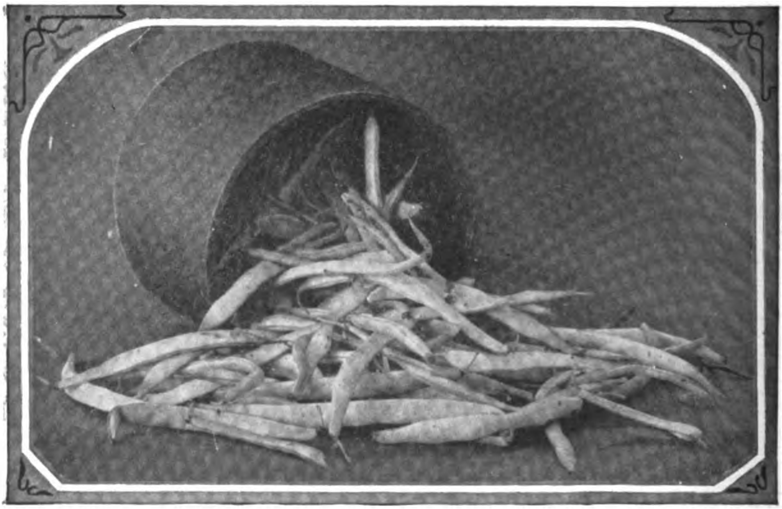
Varieties

There are hundreds of varieties of beans that are well known on the market and it is suggested that the grower find out the varieties that do best in his locality. The following varieties are commonly popular with truck growers and gardeners and are suggested as a basis for selection.

Snap or String Beans. Dwarf varieties; Red Valentine, Wardwell, Kidney Wax, German Wax, Burpee Stringless Green Pod and Burpee Kidney. Climbing varieties—Golden Carmine, Lazy Wife, Kentucky Wonder.

Green Shell Beans. Climbing varieties of limas; Leviathan and Ideal. Dwarf limas. Henderson Bush Lima, Fordhook and Goddard.

Dry Shell Beans. Navy Pea, Early Wonder, White Pea, White Kidney, White Marrow.



Wax beans such as these can only be picked from healthy and well-fed plants. V-C Fertilizers are a great bumper crop producer.

The common navy bean is properly known as the navy pea bean and there are dozens of good varieties. Seed which is hand picked should be obtained from reliable seedsmen or growers who know their stock is free from anthracnose, a disease which carries over in the seed and often manifests itself by reddish spots on the seed. Avoid all seed showing any indications of this disease.

Preparation of the Soil

A fine deep seed bed is desirable for beans. It is a common fallacy to think that any ground is good enough for beans. Good soil and thorough preparation are required if profitable crops are produced. The soil should

be prepared early and worked frequently until planting time. If the soil is thin or rather sandy a top dressing of well rotted manure should be applied just before or after planting the seed.

Planting beans in the row. From now on the success of the crop depends on the soil conditions and fertility. V-C Fertilizers will help supply those plant food elements which are needed to produce the highest quality and the greatest yields.

Time and Rate of Seeding

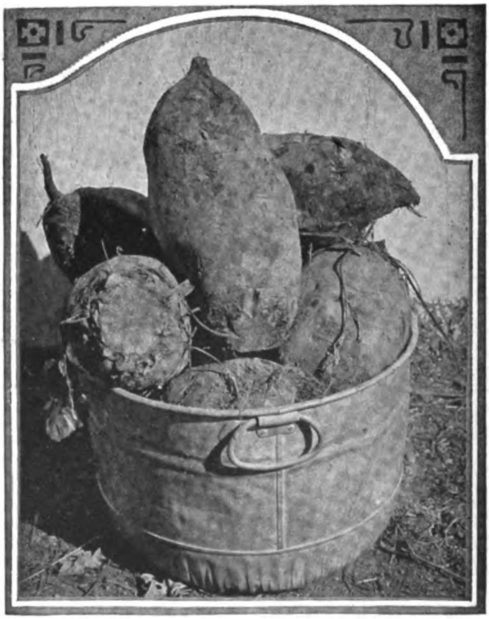
The bean is essentially a warm weather crop and should not be planted until danger of frost is past. However, it is a common practice with market gardeners to take the risk and plant the crop a couple or three weeks earlier than it should be because they know their profits will be large if the weather does not injure the crop, and if the frost catches the young plants, the ground can be used for another crop.

Dwarf Snap or String Beans.—Drill in rows 20 to 36 inches apart and 3 to 5 inches apart in the row. Wide rows are used if horse cultivation is practiced. Cover the beans with about 2 inches of soil.

Pole Beans.—Plant in hills 4 feet by 4 feet, dropping 3 to 4 beans in the hill.

Dwarf Limas may be planted the same as string beans or planted in hills, dropping 3 to 4 beans in a hill 12 to 14 inches apart in the row.

Dry Shell beans are usually planted quite late to avoid the severest attacks of rust, anthracnose and weevil. They should be planted in a carefully prepared seed bed from June 15 to July 1 at the rate of two to four pecks per acre, depending upon the size of the beans.



It doesn't take very many of these Mangel-Wurtzel beets to fill a bushel measure. These were grown on the farm of Mr. J. C. Andrews, Westpoint, Indiana. This type of beet is very profitable as a feed for live stock and with liberal fertilization hundreds of bushels can be raised per acre.

Fertilization

The bean is an early maturing crop and demands an abundance to available plant food. This is especially true for snap or string beans, because large tender pods result from a rapid growth. It is evident then that the quality and yield depend upon intelligent fertilization. The bean requires a large quantity of phosphoric acid and potash and a small por-

portion of nitrogen. On rich soils the nitrogen can be left out of the fertilizer if the beans are inoculated. An application of V-C Fertilizers high in nitrogen may be made after the crop is a few inches high. On rich soils it is customary to apply 500 to 1,000 pounds per acre of V-C Fertilizers, containing 10 to 12 per cent. of phosphoric acid and 3 to 6 per cent. of potash.

Cultivation

Frequent and shallow cultivation should follow the appearance of the plants. Cultivators with narrow shovels or spring tooth attachments

If you are particularly interested in Sugar Beets, write us for a copy of our special book on this subject.

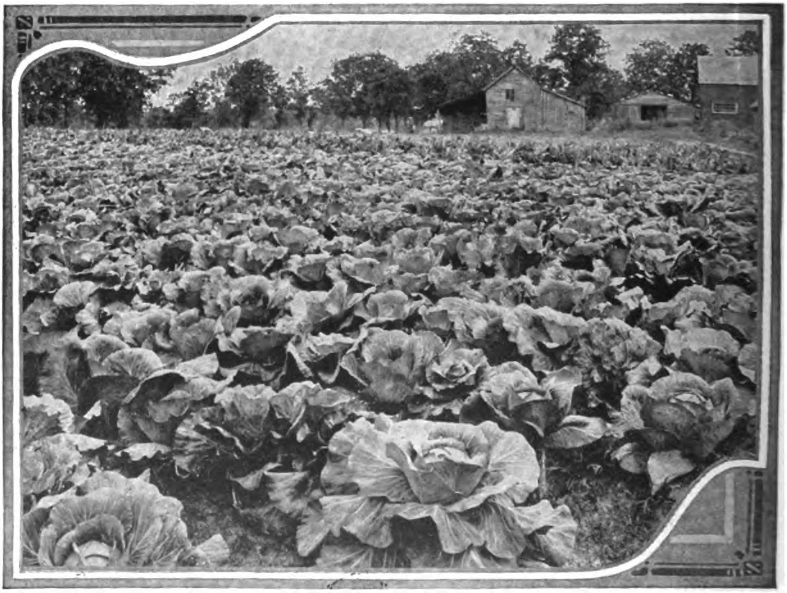
should be used and the work should not be done while the plants are wet with dew or rain. Many growers of navy beans hill the plants slightly at the last cultivation to facilitate harvesting with a machine.

Beets

This is a valuable crop for gardeners who follow intensive cropping. The beet is a cool season crop that thrives in rich sandy loam soils and can be planted as soon as the soil can be put into proper condition. Fall preparation is often desirable for the early crop.

Successive plantings may be made of the round or oval shaped beets until August but the long beets should be planted before the first of June because they require a good while to mature.

If the rows are cultivated with a hand wheel hoe they should be 12 to 15 inches apart. If horse cultivation is practiced the rows will need to be 24 to 30 inches apart. The distance between the plants will depend upon the variety; the large rooted varieties are thinned to 5 inches apart and the small ones to 3 inches. The seeds are planted ¾ to 1 inch deep in the row. One ounce of seed will drill about 100 feet and 5 to 7 pounds will seed an acre.



A good crop of Cabbages.

Fertilization

The beet must grow rapidly and mature early to develop the high quality demanded by the market. A sufficient supply of available plant food should be applied to insure the quality and yield desired. Eight hundred to fifteen hundred pounds of V-C Fertilizers analyzing 3 to 4 per cent. of nitrogen, 8 to 10 per cent. phosphoric acid and 4 to 6 per cent. of potash should be applied broadcast just before the seeds are planted. After about three weeks apply 200 to 400 pounds of fertilizer high in nitrogen per acre between the rows and work it into the soil. This application may be repeated three or four weeks later.

Thorough cultivation should be given during the entire period of growth.

Varieties

Crosby's Egyptian, Bassano, Early Blood Turnip, Early Eclipse are suggested as excellent varieties. Market conditions must be studied in selecting strains or varieties so the grower may take advantage of existing references.

Cabbage

Cabbage is one of the most popular truck and garden crops and can be fitted into the rotation on some farms quite effectively. The crop is contracted for by canning companies and also finds a ready market in the cities. When grown as a truck crop it should be produced in sufficient

Cabbages on farm of Mr. B. G. Nidgeon, Norfolk, Va. These plants were set out in the fall and the photo taken in the spring.

quantities so that carload shipments can be made from the community at stated intervals.

Early cabbage is grown for the city market and like all early vegetables it should grow rapidly to obtain the quality desired by the market. Early cabbage is often grown as a companion crop with lettuce.

Cabbage prefers a rich, loose, well drained soil which contains an abundant supply of organic matter; the loams, sandy loams and muck soils are well adapted to the early crop. Heavy and undrained soils are cold and not adapted to early vegetable crops.

The plants should be started in the hotbed in March and transplanted into flats when about two inches high.

The soil should be deeply and finely prepared in the early spring. It is always desirable to disk the ground well before breaking and it should

be worked down within a few hours after plowing. Well rotted manurs should be worked into the top soil. Deep and thorough preparation makes it possible to conserve soil moisture to better advantage and inasmuch as the crop depends upon moisture and available plant food for rapid growth, it is important that the seed bed be properly prepared. The grower should not plant cabbage on land infected with club root or rot fungi.

Fertilization

As yields of five to fifteen tons of cabbage are secured per acre, it is evident that the soil should be well fertilized so the crop may grow and mature rapidly.

The kind of soil will influence the selection of fertilizer. Muck and sandy soils require a high per cent. of potash; sandy and clay soils require nitrogen in sufficient quantities, and all soils need phosphorus. Basic recommendations are made as follows: Muck soils, 2-8-10; sandy soils, 5-8-10; clay soils, 4-10-4. From 1,000 to 2,000 pounds of fertilizer should be applied per acre just before setting the plants and an application of nitrate of soda should be applied between the rows about one month after the plants are set.

Early Cabbage

Varieties:

Following is a list of early cabbages which are generally popular. Early King, Succession, Jersey Wakefield, Early Summer and Charleston Wakefield.

Setting the Plants:

The plants are transplanted after danger of frost in rows 24 to 30 inches apart and from 16 to 18 inches apart in the row. Close setting in the row causes smaller heads to develop and this is desirable from many standpoints, but the market demand should regulate this. The plants should be around six inches high when transplanted in the field.

Late Cabbage

The main crop of cabbage is an important garden crop as well as a field crop. It is grown extensively in the muck soils, dark loams and low lying moist lands which are rich in organic matter.

Starting the Plants:

The seed may be sown early in May in a selected place which is known to be free from cabbage diseases and on which no cabbage refuse has been thrown. The rows are laid off just wide enough to permit cultivation with a wheel hoe. Before the plants are an inch high they should be thinned to 3 inches apart in the row.

The plants are transplanted to the field about the middle of June. At that time they should be about 6 inches high. Many of the most successful growers drill the seed in the field in rows 3 feet apart and then thin them to 2 feet apart in the row. Success depends to no small degree upon having healthy, vigorous plants to begin with.

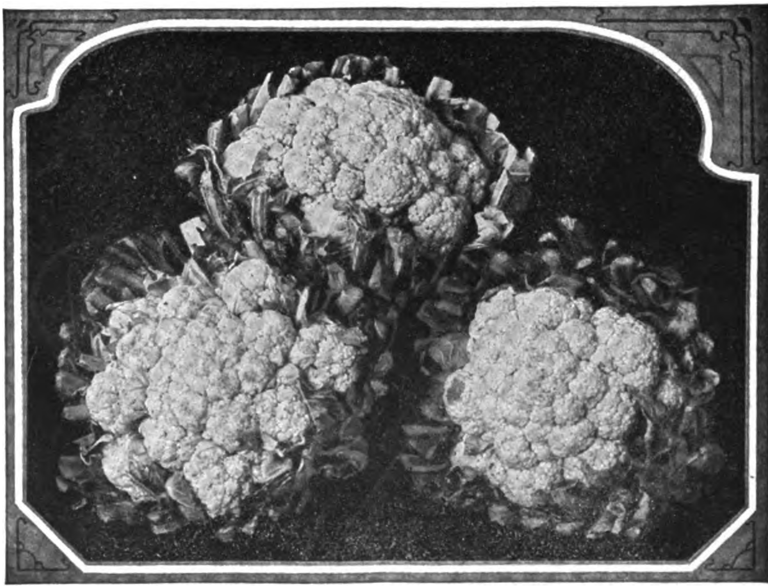
Varieties:

The Danish Baldhead, Flat Dutch, Autumn King and Danish Roundhead are popular varieties of late cabbage. Yellows resistant varieties are being developed and used successfully in many sections.

The fertilization and cultivation of the main crop is practically the same as that recommended for the early varieties.

Carrots

The carrot is becoming more popular as a truck crop because people are learning more regarding its preparation for the table. It is a healthful vegetable and the cities are furnishing a greater demand for it.



Cauliflower needs the proper kind and amount of Fertilizer. V-C Fertilizers are the ideal bumper crop producer for all crops.

The cultural directions given for the beet are applicable to the carrot.

The early varieties require from 10 to 12 weeks to mature and the late varieties from 16 to 20 weeks. The varieties commonly grown are the Early Short Scarlet, Danvers Half Long, Chantenay and Long Orange.

Cauliflower

The cauliflower is a member of the cabbage family and the cultural directions given for the cabbage are for the most part applicable to this crop. It is a highly profitable crop to grow but is more exacting in its

demands than cabbage. The soil should be deep, rich and moist so that the crop will not suffer for moisture during its growth. Weather conditions influence the crop and only the careful and experienced grower, who has studied the needs of the crop, can expect maximum results.

The crop is generally very profitable, considering the results of a number of years, and unfavorable conditions during one or two seasons should not cause the grower to abandon the crop. The demand is large and is continually growing and gardeners and truck growers who develop ability in producing good cauliflower will realize handsome returns.

Cauliflower demands a deep, moist and well fertilized soil. Handsome profits can be realized when it is properly grown. The application of V-C Fertilizers matures the crop early before the excessive heat sets in.

The large and most successful cauliflower sections are located near large bodies of water that tend to keep temperature and moisture conditions more uniform.

For early cauliflower the seed should be sown in the hotbed about one week sooner than cabbage seed. The hotbed management is the same as for the early cabbage. The young plants should be hardened off carefully before transplanting by gradually making them accustomed to outdoor conditions. The sash should be raised more and more each day for a week or ten days and then the flats should be transferred to the coldframes for a

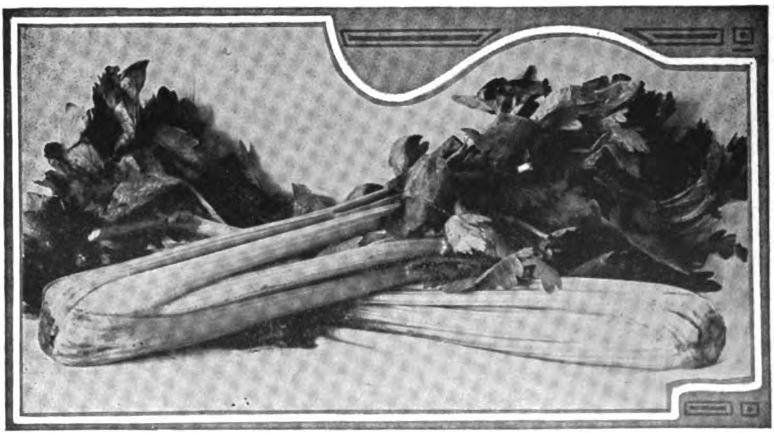
few days. Transplanting to the field should be done the latter part of April on a day when the temperature is normal. The plants should be set in rows 3 feet wide and 2 feet apart in the row. The plants should be 5 or 6 inches high when transplanted.

The fertilizer recommendations given for cabbage should be followed for cauliflower. Heavy applications of V-C Fertilizers and also of nitrate of soda are especially important because the crop must mature before hot, dry weather sets in.

When the heads first begin to form the leaves should be drawn together and tied at the top to prevent sunburning. The heads develop rapidly and should be examined daily so they may be cut before the head begins to break.

Varieties

Dwarf Erfurt and Snowball are popular early varieties. Seafoam, Dry Weather and Autumn Giant are extensively used as late varieties. Only



A perfect picture of celery perfection. Clean and well formed.

seed of high quality should be purchased because poor seed usually results in poor heading.

Thorough cultivation should be given the plants at all times to conserve moisture.

Late Cauliflower

Late cauliflower is planted in May so it will mature during the cool weather of autumn. The plants are started in a well prepared seed bed and given careful attention because the seed is quite expensive. The seeds are planted in May in open ground. When large enough the plants are set in rows three feet apart and two and a half to three feet apart in the row. In other respects, the culture of late cauliflower is the same as for the early crop.

Celery

Celery is a very popular garden and truck crop and can be grown in most any good garden soil. Commercial celery growing is largely confined to the muck and black sandy soil areas which have been drained and reclaimed, because these types of soil are rich, loose, and moist. Rich, sandy loams and loams containing an abundance of organic matter are also well adapted to celery growing, the former being specially suited to the early crop.

The plants for early celery are grown in the hotbed. The seed is sown about the first of March and when the plants have made a good growth they are sheared and thinned. Shearing the plants makes them stocky and

V-C Fertilizers were used on this crop of Celery and the result speaks for itself. You can get the same abundant yields from your fields by the use of V-C. Mr. Mason of East Bloomfield, N. Y., is the proud owner of this field and he tells what he thinks of V-C in his testimonial on page —.

strong. For extra quality they should be transplanted into flats. They are transplanted in the field about the first of May.

The plants for the late crop are grown in a well prepared seed bed in open soil which is well drained. Fall plowing is usually practiced in preparing the ground for this crop. The seeds are sown as early as weather and soil conditions will permit.

Celery seed should be drilled in rows 6 inches apart and the seed covered with ⅛ inch of fine moist soil. Only fresh seed of a known good variety should be used, because many failures result from poor seed. The seed bed should be watered after sowing the seed and kept moist for 10 days or more. After the rough leaves begin to form, thin the plants to 1½ to 2 inches in the row.

The plants are ready to set in the field when 5 to 8 inches high, or about five weeks after seeding. Water the bed thoroughly a few hours before pulling the plants for transplanting to the field.

The planting distance depends upon the variety and method of blanching to be followed. If boards are used the rows should be 2 to 3 feet apart and if the soil method is practiced 4 to 6 feet apart. The plants are set from 4 to 8 inches apart in the row. Transplanting should be done on cloudy days or late in the afternoon just before a rain if possible. They should be watered at the time of setting.

Fertilization

The celery crop is a gross feeder and must grow rapidly if a product of good quality is obtained. The judicious use of manure and commercial plant food is extremely important. Ten to fifty tons of manure per acre

A method of Blanching Celery in Southern Indiana. Fertile soil and proper cultivation are the best insurance for bumper crops.

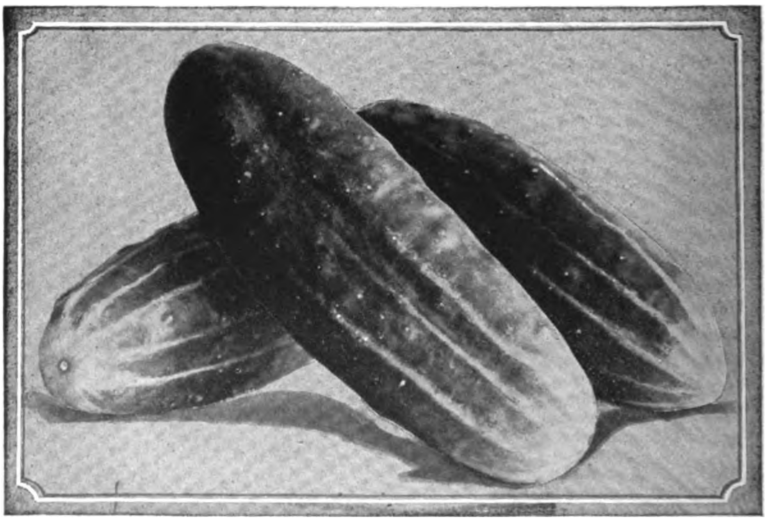
should be applied to the land. If fresh manure is used it should be applied during the winter, but if well-rotted material is available it may be applied in the spring. Intensive growers who set their plants 4 inches apart in the row and have rows 18 to 24 inches apart apply 1½ to 2 tons of fertilizer per acre. The use of too much nitrogenous manure on rich soil may cause pithy celery.

Growers of Indiana, California, Michigan and Florida have found V-C Fertilizers analyzing 4 per cent. of nitrogen, 8 per cent. of phosphoric acid and 8 to 10 per cent. of potash to be adapted to the needs of the crop. Applications ranging from 1,200 to 4,000 pounds per acre are made broadcast just previous to setting the plants. One ton per acre is not sufficient for the

largest returns. After the plants are thoroughly established 150 pounds of nitrate of soda should be applied along the row and cultivated into the soil. Two or three subsequent applications of 200 pounds of nitrate should be made at intervals of three weeks.

Cultivation

The celery plant has a shallow root system and all cultivations should be shallow. As soon as the plants are set, the field should be cultivated carefully so that no dirt is thrown in the heart of the plants. Cultivation should be continued after each rain for the purpose of maintaining a fine soil mulch at all times.



These Cucumbers are bound to bring a good market price. Use V-C Fertilizers and get the best prices for your crops.

Varieties

White Plume, Golden Self Blanching, Boston Market, Winter Queen and Giant Pascal are popular varieties.

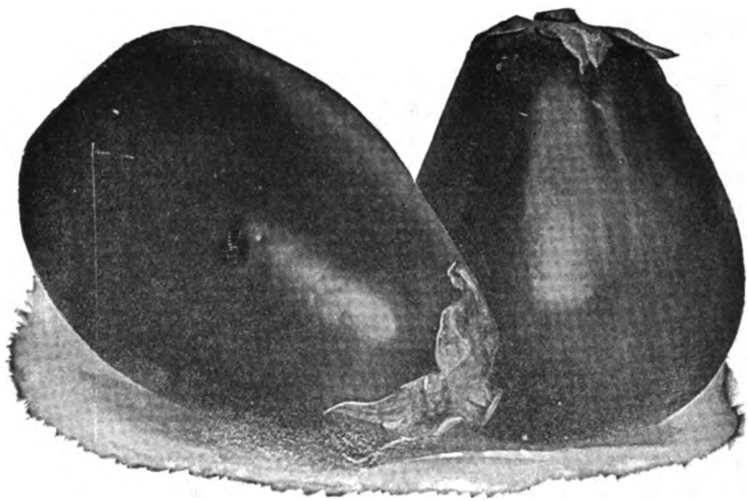
Cucumbers

This crop is grown extensively for commercial pickling purposes and also in home gardens. In sections where salting stations are located and where labor is available the crop is highly profitable as a field crop.

Light sandy loam soil is preferable for the early crop. The heavy loams are used for the late crop and the yields are usually larger on these types of soil. The soil should be well drained and contain an abundance of organic matter.

Early plowing and working of the soil is essential. The usual good soil preparation recommended for truck crops in general is suited to the need of this crop. Stable manure applied during the winter and turned under will greatly benefit the crop.

The plants for early cucumbers are started in the hotbed by sowing the seed about the last of April in pots and in veneer, or paper bands filled with rich garden soil or compost. Six to eight seeds are planted in each hill and after the plants are a couple of inches high these are thinned to three or four by removing the weaker plants. The drill system of planting is also used in which the rows are 6 feet apart and the plants 12 to 16 inches apart in the row. It is important that the seed should be used freely to insure a good stand in both systems.



The Eggplant is a delicious vegetable, when the quality and size is of the best it brings a fancy price. When V-C Fertilizers are applied such results as the above are entirely possible.

Fertilization

A rapid and unchecked growth is essential to high production. This can be accomplished by a liberal application of fertilizer. Experienced growers have found it most profitable to apply broadcast 1,000 to 1,500 pounds per acre of V-C Fertilizers containing 3 to 4 per cent. of nitrogen, 8 to 10 per cent. of phosphoric acid and 3 to 6 per cent. of potash. A fertilizer low in potash should be used. A fertilizer high in nitrogen or an application of nitrate of soda at the rate of 150 pounds per acre should be made along the rows after the plants are well started.

Many growers mix manure in the hill previous to planting the seed and in such cases it is advisable to mix fertilizer with the manure also.

Cultivation should commence soon after the plants are set or the seed is planted and should continue as long as it is possible to cultivate without injurying the vines.

Egg Plant

This is a delightful vegetable which was brought from the tropical zone and is now grown successfully by starting the plants under glass. Warm sandy loam soils which are rich and well drained are best adapted to growing the crop. Cover crops or barnyard manure should be turned under in preparing the soil. The seed bed should be deep and well prepared. Clay soils are not adapted to the crop.

The plants are started in the greenhouse or hotbed in pots or paper bands containing rich soil. The plants are very susceptible to any change of conditions, especially if the root system is disturbed, and it is, therefore advisable to use at least 4 inch pots or bands and leave the plants alone until they are transferred to the field.

This field of Romaine lettuce bears testimony to the wonderful results obtained by the use of V-C. Mr. J. H. Snyder, of Sodus, N. Y., applied 1500 lbs. of V-C Fertilizers to the acre and his yield was 1,000 cases per acre. V-C produces results.

The soil should receive a broadcast application of 1,000 pounds of V-C Fertilizers containing 3 to 4 per cent. of nitrogen, 8 to 10 per cent. of phosphoric acid and 3 to 8 per cent. of potash, before the plants are set. A month after the plants are set a top dressing of 400 pounds of V-C Fertilizers should be applied between the rows.

Fertilizer is essential to the growing of a maximum crop.

The plants should be about 8 inches high when set and all danger of frost should be past. The large varieties are set in rows 3 to 4 feet apart and 2½ to 3 feet apart in the row. The root system of the plants should be disturbed as little as possible when transferring the pots or bands to the

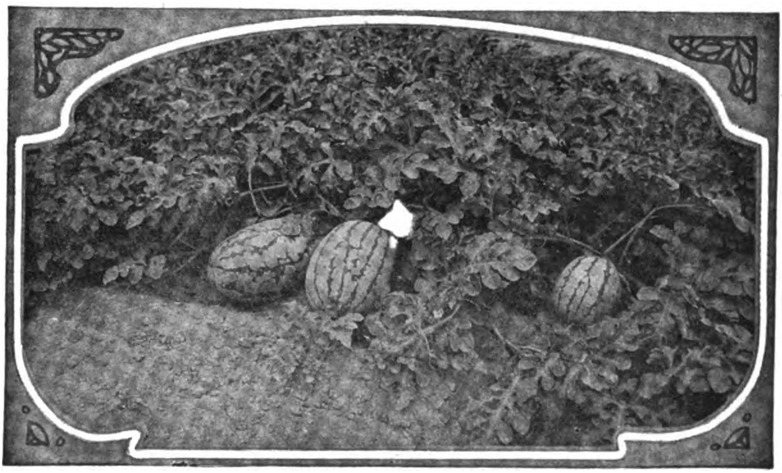
field. When the hill is set in place it should be well watered and when this has soaked up, the hole should be filled with soil.

The cultivation should be thorough and shallow at all times to insure plenty of moisture. The soil should be cultivated after each rain to maintain a dust mulch and prevent baking.

Kohlrabi

This vegetable is rapidly growing in popularity and is easy to grow. It is closely related to the cabbage and the same cultural directions apply to both crops. The rows are made wide enough apart to facilitate cultivation and the plants are set about 8 inches apart in the row.

The crop should grow rapidly. It has the same fertilizer requirements as the cabbage.



Quality watermelons can be grown by the use of V-C Fertilizers.

The plants should be harvested when the stems are between 1½ and 2 inches in diameter. They are most edible at this size.

Lettuce

Lettuce is the most important salad crop grown and is regarded by gardeners and truck growers as one of their most profitable crops.

It prefers a loose, loamy soil. The sandy loams, when properly fertilized and fitted are best adapted to the needs of the crop. The muck soils are also well adapted to lettuce and are being planted extensively to both the head and leaf varieties during the last few years.

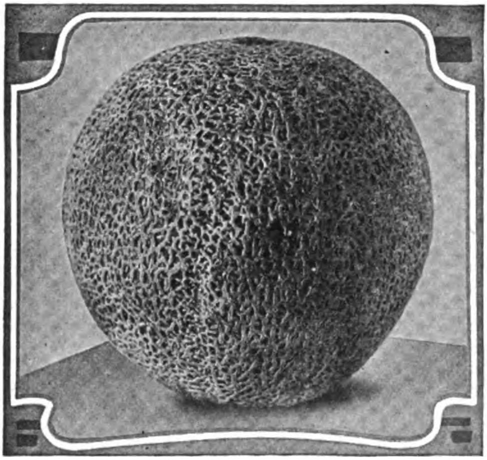
In many sections it is almost impossible to produce head lettuce from field plantings, because weather conditions are not suitable. It is custom-

ary to start the early plants in the hotbed about the first of March and transplant to flats in about three weeks, setting the plants 2 inches apart each way. The hotbed plants should be handled the same as cabbage plants.

The soil should contain an abundance of organic matter and manure should be turned under. Excellent soil preparation should be given and 1,000 to 1,500 pounds of V-C Fertilizers should be applied broadcast. An abundance of plant food and moisture makes lettuce crisp and tender.

If the seed are sown in the field, they should be drilled in rows 12 to 15 inches apart and later thinned to about a foot apart in the row. They should be sown on the surface soil and raked in lightly.

Lettuce is used extensively as a companion crop with cabbage, cauliflower, etc. and as a succession crop after early crops. Successive plantings should be made throughout the season.



Cantaloupe grown by Mr. M. Y. Yates, Decker, Indiana. Melons should be properly netted before they are picked. The color and the netting are excellent guides to the experienced grower as to proper maturity. Well fertilized melons give greater yields, ripen more uniformly, and therefore command the best prices. V-C is an excellent Fertilizer to use.

Melons

The cantaloupe and watermelon are popular crops in those sections having light sandy loam soil. Many growers realize net profits ranging from $100 to $400 per acre from these crops.

The young plants should be started in paper or veneer bands in a hotbed or coldframe. The bands are filled with rich compost soil and the seed are planted, covered lightly with soil and thoroughly watered. Since the plants are even more tender than cucumbers, every care must be given to the management of the frame.

If an extra early crop is not desired a common custom is to plant the seed in the hill out in the field, putting six to eight seeds to the hill and thinning out all but two or three of the stronger ones, after the danger from striped beetles is over.

The hills are laid off by plowing furrows each way through the field so the intersections will be 5 x 5 feet for cantaloupes and 8 x 8 or 10 x 10 feet for watermelons. Well rotted manure and fertilizer are mixed with the soil in the bottom of the hill and this covered with soil. An application of 600 to 1,000 pounds per acre of V-C Fertilizers containing 2 to 4 per cent. of nitro-

gen, 8 to 10 per cent. phosphoric acid and 3 to 6 per cent. potash may be profitably used. Part of this may be applied broadcast and part put in the hills.

The land should be thoroughly prepared before setting the plants or planting the seed. The crop should be cultivated as long as possible without injurying the vines. Do not cultivate when the vines are wet with dew or rain.

Insect and Disease Control

The striped cucumber beetle and the melon louse are the most injurious insects affecting the crop. The melon rust and bacterial wilt are diseases which most seriously affect production.

Field of young onions in splendid condition.

It is customary to spray the crop with Bordeaux mixture containing one-half pint of nicotine sulphate to 100 gallons of the spray solution The material is applied upon first evidence of infection and is continued at periods of 7 to 10 days until infection is controlled.

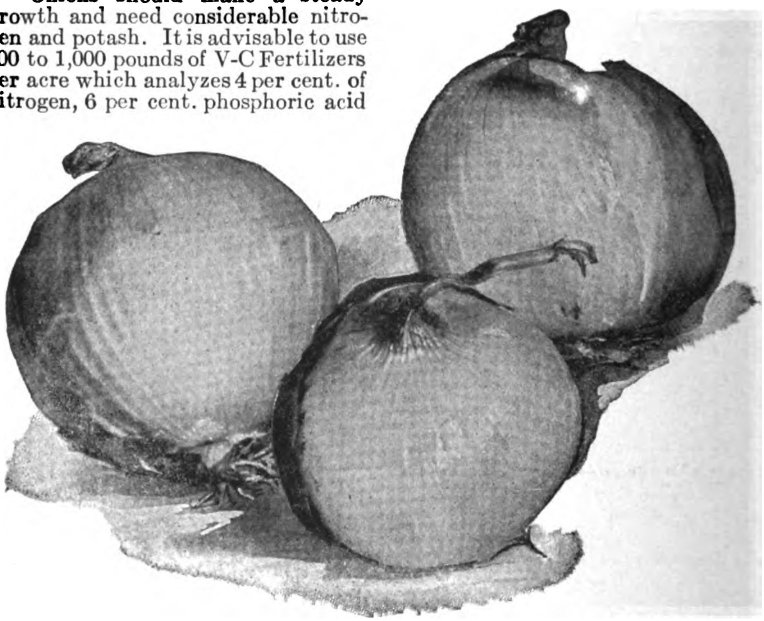
Onions

Onion growing has become an extensive industry in sections having muck soils, rich sandy loams and black loams. Onions have proven to be a highly profitable crop, but have the disadvantage of requiring a great deal of hand labor.

The land should be level so no damage will result from washing. The soil must contain an abundance of organic matter and be well prepared, because the seeds are small and must have a congenial place to grow. Generally speaking, onions should follow some cultivated crop which was heavily manured the previous year. Fall plowing is desirable on many types of soil. If plowing is deferred until spring it should be done as early as possible so moisture will be conserved.

On muck and acid soils it is advisable to apply 2 to 4 tons of ground limestone per acre after plowing and thoroughly work it into the surface soil.

Onions should make a steady growth and need considerable nitrogen and potash. It is advisable to use 500 to 1,000 pounds of V-C Fertilizers per acre which analyzes 4 per cent. of nitrogen, 6 per cent. phosphoric acid



Three splendid specimens of the Spanish white onions.

and 8 to 10 per cent. of potash. This is applied broadcast just before drilling the seed. As soon as possible in the spring drill the seed in rows 12 to 18 inches apart. Cultivation should begin when the plants are 1 to 2 inches high and continue at frequent intervals throughout the growing season. The plants should be thinned to 3 to 4 inches apart in the row when 4 to 8 inches high. As a rule two or three hand weedings will be required.

Harvesting

If the onions are to be stored it is best to allow them to become fully ripe before pulling. At this time the tops are broken over and dead and the other skins of the bulbs are dry. Care must be taken, however, to harvest the onions before a second growth is induced. Harvesting is usually begun when the tops have turned yellow.

The onions should dry in the field several days before storing.

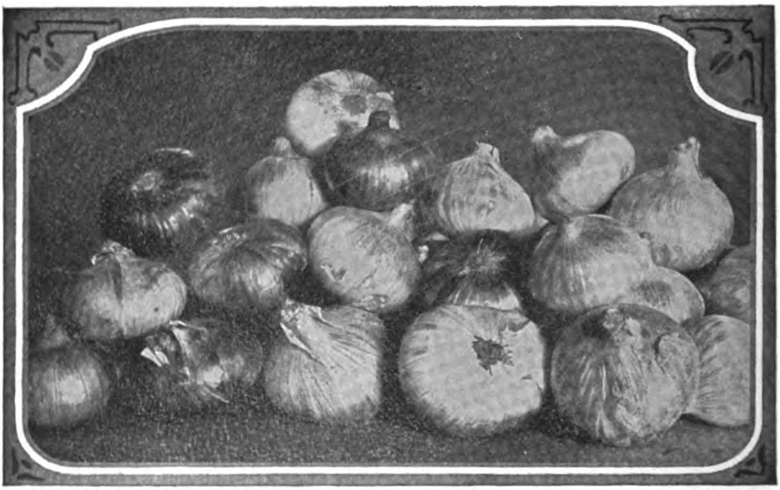
Some Hatfield, Mass., Views of V-C'd Onions.
A—Bagging onions with scale and bagger on farm of P. Mullany, Hatfield, Mass., a V-C user.
B—Onions in field preparatory to bagging for market.
C—Fine stand of V-C'd onions on farm of Mullany Bros., Hatfield, Mass.
D—Onion Storage Sheds, Hatfield, Mass.

Peas

This vegetable is regarded by market gardeners as one of the most important early season crops. It is also grown extensively as a field crop for canning factories.

The early crop for table use is generally grown on rich sandy loam soil which is cool, moist and well drained. Successive plantings are made to extend the season over as long a period as possible. The late crop does well on rich clay loam or silt loam soils which are well drained.

For the canning factory, the crop may be grown by most any farmer who practices good farming methods. As a field crop it has many advantages that should commend it to growers in the vicinity of canning factories.



Red and white Wheathersfield onions. The plant food as contained in V-C is necessary to every plant and produces such solid meats as shown above.

(1) The crop is contracted for and consequently a market is assured; (2) cultivation is not required after the crop is planted; (3) it matures in time to use the ground for a crop of late potätoes, beans or cover crops; (4) the crop is handled with machinery and horse labor; (5) it fits into the rotation well; (6) it is a money crop that is not hard on the land.

Soil Preparation

In both the garden and the field, the soil should be prepared very carefully and thoroughly. Manure should be applied at the rate of 8 to 12 tons per acre and the ground disked before plowing. After plowing, it should be cross disked and dragged and harrowed.

Fertilization

For market or table use peas should mature early. For canning purposes heavy production is especially desired. Therefore, liberal fertilization is essential. One thousand to fifteen hundred pounds of V-C Fertilizers containing 2 per cent. of nitrogen, 10 per cent. of phosphoric acid and 3 to 6 per cent. of potash should be applied broadcast just previous to planting the crop.

Planting

Market or garden peas are drilled in rows 18 to 36 inches apart depending upon the variety. The seeds are dropped 2 to 3 inches apart in the row. The depth of planting will depend upon the season and soil type. Early peas are planted about 1 inch deep; later varieties about 2 inches deep in

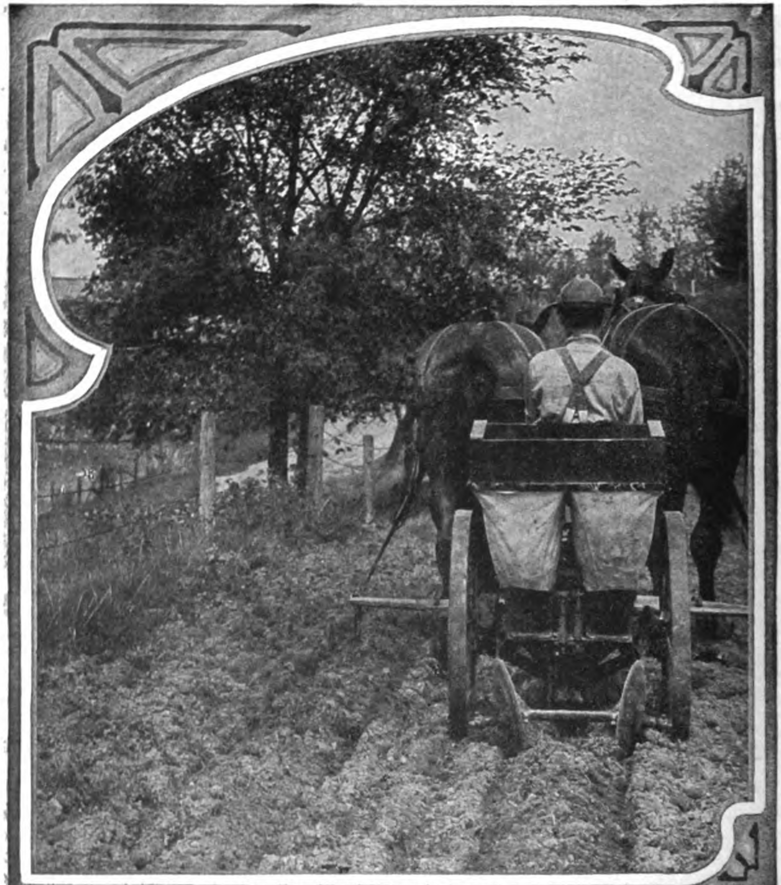
To get the best market prices for Early June Peas, they must be on the market early—V-C Fertilizers will help do this and will also aid in producing a crop of the finest quality.

loam soils and 3 inches in sandy soils. The early varieties are sown as soon as the ground can be prepared properly and the later varieties, two to three weeks later. For the fall crop dwarf varieties are planted in August. Peas for the canning factory are drilled broadcast with a grain drill and are harvested with an ordinary mowing machine.

Varieties

The smooth varieties are hardier than the wrinkled sorts and should be used for the first planting. Alaska is one of the most popular. Gradus is an extra early wrinkled variety and is followed by the Thomas Laxton.

There are numerous excellent varieties suited to market and garden use. For the canning factory the Alaska, Advancer and Horsford are profitable varieties.



A recognized type of modern Potato Planter. Modern methods linked up with V-C Fertilizers are bound to prove a winning pair.

With the exception of the dwarf varieties, it is necessary to cut brush and stick this upright in the row for the peas to climb on.

Frequent level cultivation should be practiced between the rows. Peas can be followed by succession crops after they are harvested.

Irish Potatoes

The potato is a popular vegetable in every garden and is also a profitable field crop. It thrives best in a deep, mellow, free working loam soil, but may be grown successfully in most types of soil containing an abundance of organic matter. Stiff clay soils should be avoided.

The soil for potatoes should be well drained and deeply prepared. Fresh stable manure should not be applied to the land because it increases injury from scab. It is better to apply fresh stable manure to the land the year previous so it will be thoroughly decayed when the potatoes are planted. Well rotted manure should be applied and turned under if its use is available. Immediately after plowing, disk and harrow the land until it is in fine condition.

Potatoes in Young Orchard. Purdue Farm, LaFayette, Indiana.

Fertilization

The potato crop requires a large amount of available fertilizer and successful growers in the potato sections apply from 1,000 to 2,000 pounds per acre. One thousand pounds of V-C Fertilizers containing 3 per cent. of nitrogen, 8 per cent. of phosphoric acid and 3 to 10 per cent. of potash should be applied broadcast and 500 pounds applied in the row before the seed is planted. This is best accomplished by laying off the rows with a plow and then putting the fertilizer in the furrow. Inasmuch as the seed pieces should not come in contact with the fertilizer, it is advisable to plow back through the furrow to mix the soil with the fertilizer.

Varieties

The market preferences should be taken into consideration when selecting varieties. The common early varieties are Irish Cobbler and Early Ohio.

The following late sorts for the main crop are suggested; Rural New Yorker No. 2, Sir Walter Raleigh, Carman No. 3 and the Burbank.

Boys hunting down the potato bug near Ladoga, on the farm of Mr. Geshern.

Seed Stock

Well selected, well stored seed potatoes should be used. The northern grown stock is generally less mature and therefore more desirable.

The method of cutting seed potatoes varies with the locality, but extensive experiments have shown that it is not profitable to use seed pieces with less than two eyes and the pieces should not weigh less than an ounce. From ten to fifteen bushels are required to plant an acre.

Sun sprouted potatoes will give a larger yield and earlier maturity if used for the first crop. The seed should be treated before sun sprouting or cutting to eliminate the possibility of several diseases. Soak the uncut tubers for one and one-half hours in a solution made by dissolving four ounces of bichloride of mercury in thirty gallons of water. This treatment will kill resting spores of scab and rhizoctonia.

The seed pieces are planted in rows 26 to 36 inches apart. The early potatoes are placed about 12 inches apart in the row and the late varieties 15 to 18 inches apart.

Thorough and shallow cultivation should be given at all times. Level cultivation is preferred to ridging or hilling.

The harvesting of early potatoes usually begins before they have reached full size, because of the prevailing high price at that time.

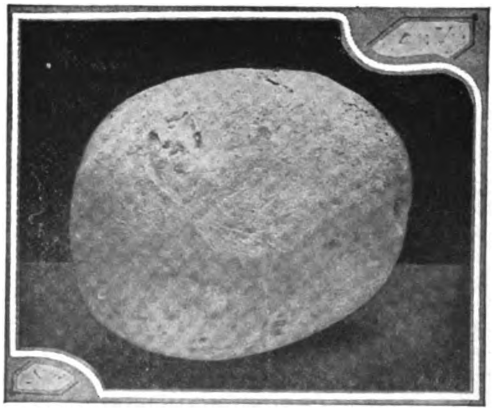
A few prize Irish Potatoes.

Field of Mr. E. E. Lambertson, Freehold, New Jersey, on which 1,500 pounds of V-C Fertilizers were applied per acre. Mr. Lambertson had about 25 acres in potatoes and his yield was about 340 bushels per acre. Consequently he is a V-C booster—the reason why can be readily seen.

Sweet Potato

The sweet potato is rapidly becoming more important as a truck crop and deserves the consideration of a large number of growers. It is adapted to a wide variety of soils and climates but prefers the light sandy loams. It thrives best in a reasonably dry soil and climate.

The sweet potato is grown from plants started in the hotbed. The sweet potatoes to be used as seed stock are placed in the hotbed about six weeks before the usual planting date in the garden. They are usually put in trenches and covered with an inch of sandy soil. Sprouts are produced which grow to the surface and form leaves. Roots form on the young plants in addition to the one coming out from the seed stock potato. After all danger of frost has passed the plants or slips should be pulled when about six inches high and set in the field.



The type of Irish Potato best suited to the demands of the market. Liberal applications of V-C Fertilizers will develop a large crop of uniform potatoes that will command the best market price. V-C should also be used liberally on growing all Vegetables and Truck Crops.

The land for the crop is carefully prepared and then ridges 8 to 12 inches high are thrown up 3 to 3½ feet apart. Level cultivation is practiced by many growers and requires less trouble and care in cultivation. The "slips" or young plants are set in the ridges at intervals of 14 to 16 inches and the **dirt is carefully firmed around the root systems.**

Fertilization

High yields of fine sweet potatoes are closely associated with adequate and judicious fertilization. One thousand pounds of high grade V-C Fertilizers, 600 pounds broadcast and 400 in the rows, should be applied per acre just previous to throwing up the ridges or setting the plants. A supple-

mentary application of 500 pounds should be made after the plants are well started. This may be applied with a one-horse distributor.

The large two-horse implements that mark and open the rows, distribute the fertilizer and bed the rows are economical and should be used in large fields.

Cultivation

Cultivation should begin as soon as possible after the plants are set. The loose dirt between the rows should gradually be worked toward the row. A narrow, spike-tooth harrow should be used until the plants are large enough to be injured by its use. At the last cultivation the vines should be turned and considerable soil worked from the middle toward the row.

The crop should be harvested before the vines are killed by frost. Select a bright day when the ground is dry for this work. Avoid bruising the tubers and allow them to dry several hours before hauling them in.

Maturity is indicated by the yellowing of the leaves and the hardening of the main stem. If the vines are killed by frost before the potatoes are dug, the vines should be cut off close to the ground right away.

Sweet Corn

Sweet corn is a popular crop in the home garden, market garden and for the canning factory. It has the same advantages as a field crop as were mentioned for peas and can be grown quite profitably by farmers living reasonably near a canning factory. The demand for canned corn is increasing every year and farmers can well afford to be interested in this valuable crop.

Sweet corn may be grown on any good farming soil which is well drained and contains a good supply of organic matter.

The land should receive a heavy application of manure, which should be disked into the top soil before the land is plowed. A deep, fine seed bed should be prepared by disking, dragging and harrowing the land immediately after plowing.

Fertilizers

Profitable production is influenced by a rapid, thrifty growth from early season until the corn is ready to harvest. The best results and the largest profit are obtained by applying from 500 to 1,000 pounds of V-C Fertilizers containing 2 per cent. of nitrogen, 10 per cent. of phosphoric acid and 2 to 4 per cent. of potash.

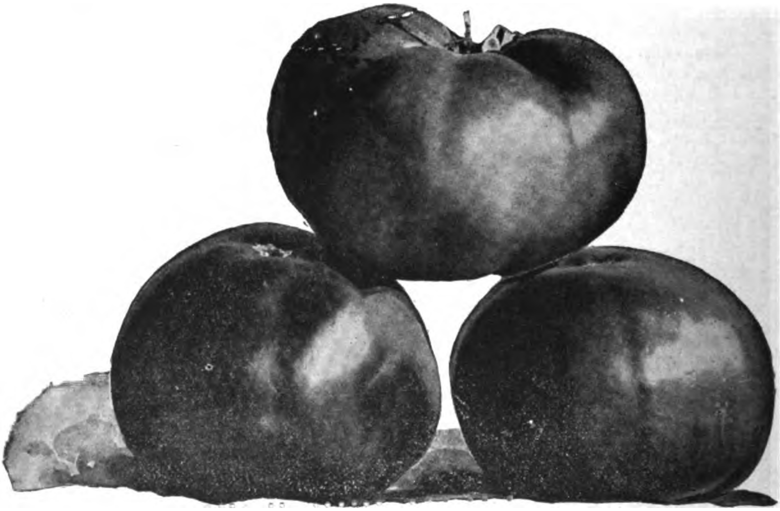
Varieties

Golden Bantam and White Cob Corn are among the most popular early varieties. Country Gentleman and Evergreen are most commonly grown for late varieties. Seed should be obtained early and tested before planting time.

Planting

Sweet corn is planted quite the same way as field corn, either checked in hills, or drilled one stalk every foot. This crop is a warm weather crop and should not be planted too early. The earlier varieties should be planted during the first part of May and the later varieties after the middle of May. Successive plantings of each should be made two weeks apart to prolong the season.

For the canning factory earliness is no advantage and the crop may be planted during the latter part of May or the first of June.



Such lusious and plump tomatoes are found only on vines which are strong, healthy and well fed. V-C Fertilizers are the best plant food.

Cultivation

A constant supply of moisture must be secured and it is therefore important to maintain a soil mulch by cultivating every week or ten days or after each rain.

Tomato

The tomato is probably the most popular and most extensively grown vegetable in this country. Every garden has tomatoes in it; market gardeners appreciate the fact that the tomato is one of their most profitable crops, and farmers find it a highly remunerative crop to grow for canning factories and for catsup and pulp factories.

The crop is adapted to a wide variety of soils but seems to prefer the well drained, sandy clay loam soils. The firmest fruit of highest quality

is raised on well fertilized clay loam soils. The soil should be well drained and well supplied with organic matter. Undrained soils must be avoided because the crop will not thrive in water logged soil.

The tomato is a native of the warmer parts of South America. To secure maximum yields it is necessary to start the plants in the hotbed about the middle of March and transplant them into flats or paper bands when they are about 2 to 2½ inches high. Nothing is more important in tomato culture than having strong, stocky, thrifty plants of a good variety. Poor plants are responsible for many failures.

Varieties

There are a large number of excellent varieties to select from. Market gardeners and truck growers usually select early varieties, such as Earliana,

Method of protecting Early Tomato plants, on the Purdue University Experimental Farm, Lafayette, Indiana.

Bonny Best and Chalks Early Jewel. The first crop finds an attractive market which is quite profitable. Among the popular late varieties are the Stone, Ponderosa, Coreless and Matchless. Growers supplying canning factories have found the Stone, Greater Baltimore, Chalks Early Jewel, My Maryland, Favorite, etc. among the most profitable varieties.

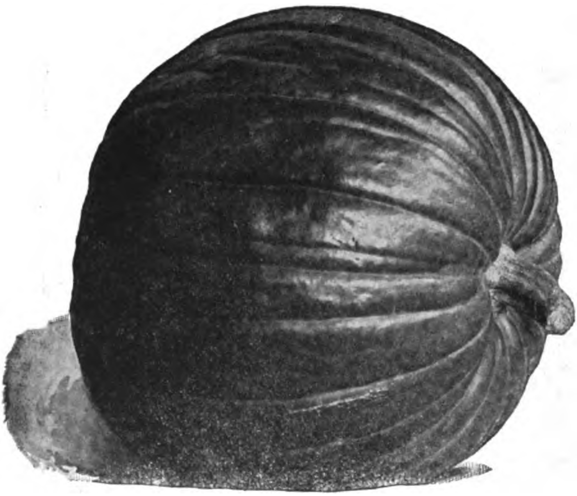
Soil Preparation

Tomatoes do well if they can follow a cultivated crop which had clover or manure turned under for it. Clay, clay loam and sod land should be broken in the fall and disked thoroughly and often in the spring until time to set the plants. The loose loams and the sandy loams may be plowed in

the spring to advantage. An abundant supply of well rotted manure should be worked into the soil if it is available.

Fertilization

Circular 59 of the Purdue University Agricultural Experiment Station states that: "No crop will respond more quickly or profitably to fertilizer added in the correct proportions than the tomato." Various methods of applying fertilizer are practiced which include broadcasting and applying in the hills. Each has advantages. Market gardeners growing a small crop may apply the fertilizer in the hill and work it in thoroughly with the soil. Large growers find that broadcast applications are more economical and are preferred because of the labor saved.



Splendid type of Yellow Pumpkin.

Six hundred to one thousand pounds of V-C Fertilizers containing 2 to 3 per cent. of nitrogen, 10 per cent. of phosphoric acid and 3 to 6 per cent. of potash should be applied per acre to the average tomato soil.

Setting the Plants

Early varieties may be set in the garden 3½ x 4 feet. Later sorts should be given more room. The plants should be stocky and from 6 to 10 inches high. They should not be transplanted to the field until all danger of frost has passed. They will grow off more quickly if well watered when transplanted. Plants intended to produce market crops should be staked.

If the crop is intended for the canning factory the plants should be set 4 x 5 feet apart and it is not customary to stake them.

The field may be laid off each way with a plow or a lister and the plants set in the intersections by hand. Great care must be exercised to see that the plants are well set with moist dirt firmly packed about the roots. If the plants are short and stocky they should be planted from 4 to 6 inches deep. Long, leggy plants should be set deeper so that only a few inches of

the plant extends above ground. Transplanting machines are used successfully by growers who put out large acreages of this crop.

The plants should not be transplanted in the field before the first to fifteenth of May. For canning purposes the main crop is usually set the last of May or the first of June. The plants should be set on a cloudy day or late in the afternoon if possible. Avoid setting tomato plants in cool, windy weather.

When the plants which are staked grow to be 18 to 24 inches high, they are tied loosely to the stake with soft cord or rags. They are tied

Farm Home of Mr. George P. Smith, of Sutherland, Mass. Mr. Smith is one of a host of satisfied V-C Fertilizer users.

occasionally as they grow taller. Experiments have shown that maximum production is obtained when the plants are not pruned.

Cultivation

The plants should be cultivated thoroughly and often. Tomato plants require an abundance of plant food and moisture and a soil mulch should be maintained by frequent cultivation as long as possible without injuring the vines.

Turnips

Turnips are grown in almost every family garden and also in many market gardens. They are grown for both spring and fall consumption. They are relished in many homes. Gardeners usually find a ready market in towns and cities for this vegetable.

Turnips thrive best in a rich well fertilized loam soil. Heavy clay soil poorly drained soil and thin soil are not adapted to the crop.

Turnips thrive best in a rich, well-fertilized, warm soil. For fertilizing your fields and securing greater yields, use V-C Fertilizers.

The soil for turnips should be well manured and heavily fertilized with a fertilizer similar to that recommended for cabbage. The seed bed should be thoroughly fined.

The spring crop of turnips is seeded about the middle of April in rows 18 to 24 inches apart. The seed should be scattered thinly in the rows and when the plants are 2 to 4 inches high they should be thinned to 4 inches apart. Frequent shallow cultivation should be given for several weeks.

The fall crop should be planted in July in rows or broadcasted thinly over the ground. If weeds are troublesome, row planting is preferable. Broadcasting the seed should be practiced on rich moist soil only.

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Free V-C Crop Books

THE Agricultural Service Bureau of the Virginia-Carolina Chemical Company issues a series of crop books similar to this one, which every farmer or land owner will find full of practical suggestions and information on the growing of the leading farm crops.

Each book covers all the steps in the production of the crop, including Soil Management, Soil Preparation, Selection of Varieties, Planting or Setting, Fertilization, Culture, Pest Control, Harvesting and Marketing. The titles of the books and the crop they cover, are as follows:

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2. ***Corn.**

   Field Corn, Sweet Corn

3. ***Tobacco.**
4. ***Wheat, Oats, Rye, Barley and Rice.**
5. ***Grasses for Hay and Pasture.**

   Grasses, Clovers, Millets, Alfalfa, Cowpeas, Soy Beans

6. ***Vegetables and Truck Crops.**

   Asparagus, Beans, Beets, Cabbage, Cantaloupes, Cashaws, Cauliflower, Celery, Cucumbers, Egg Plant, Garlic, Leek, Lettuce, Onions, Peas, Peppers, Potatoes, Irish, Potatoes, Sweet, Pumpkins, Radishes, Shallots, Spinach, Squash, Tomatoes, Watermelons, Hot Beds, Cold Frames

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*Indicates that two editions are available, one adapted to Southern conditions, the other to Northern and Western practice.

If you have any question in regard to the Management of the Soil, or the Growing of Crops, which the books do not answer, write the Bureau, stating your problem, and your letter will be given prompt attention. This service is free.

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